BULLETIN OF MISCELLANEOUS INFORMATION Appendix 1937
ROYAL BOTANIC GARDENS, KEW

REVIEW OF THE WORK OF THE ROYAL BOTANIC GARDENS, KEW, DURING 1937

General

STAFF.—Mr. J. COUTTS retired from the post of Curator on August 31st, 1937 (K.B. 1937, 396). Mr. W. M. CAMPBELL, Superintendent of the Parks Department, Southend-on-Sea, was appointed to succeed him (K.B. 1937, 442).

Mr. A. R. HORWOOD, Temporary Botanist in the Herbarium, died on February 21st, 1937 (K.B. 1937, 121). Dr. E. G. S. BROWN, Assistant Lecturer, Department of Botany, University of Edinburgh, was appointed to succeed him (K.B. 1937, 356).

Mr. G. W. ROBINSON, Assistant Curator in charge of the Herbaceous Department, resigned his post to succeed Mr. W. Hales as Curator of the Physic Garden, Chelsea (K.B. 1937, 442). Mr. Robinson's place has been taken by Mr. G. H. PRESTON, Foreman in the Herbaceous Department.

Miss A. F. FITCH retired from the post of Sub-Assistant in the Herbarium on April 10th, 1937 (K.B. 1937, 273). Mr. R. A. BLAKELOCK was appointed to succeed Miss Fitch.

Mr. R. F. WILLIAMS resigned his post as Higher Grade Clerk in the Curator's Office on June 28th to take up a position in the Air Ministry. Mr. A. HEARN was promoted from the post of Clerk in the Director's Office to fill the vacancy.

Mr. C. A. GARDNER, Government Botanist, Department of Agriculture, Perth, Western Australia, commenced work at the Herbarium on March 11th as Temporary Liaison Officer for the Commonwealth of Australia (K.B. 1937, 70).

Miss H. M. L. FORBES, Botanical Assistant in the Department of Agriculture and Forestry, Union of South Africa, left Kew on December 9th, having spent 18 months in the Herbarium on transference from that department (K.B. 1936, 533).

THE DIRECTOR, Dr. T. A. SPRAGUE and SERGEANT CONSTABLE J. SEALY were awarded medals in commemoration of Their Majesties' Coronation, May 12th, 1937.

THE DIRECTOR was awarded the Veitch Memorial Medal by the Royal Horticultural Society.

OFFICIAL VISITS.—Early in January Mr. N. Y. SANDWITH spent a fortnight in the Herbaria of Paris and Geneva examining numerous

historic types of *Bignoniaceae* described by Humboldt, Bonpland and Kunth, Lamarck, and de Candolle, with a view to completing his account of this family for Professor Pulle's " Flora of Suriname."

Dr. J. HUTCHINSON and Dr. C. R. METCALFE paid a holiday visit to the Cameroons during March and April and spent a fortnight collecting on the mountain and around Ambas Bay. They reached the summit on April 6th. About 170 specimens were collected, mainly of woody plants, including a large number of wood specimens for the Museums.

Mr. C. E. HUBBARD and Mr. C. A. GARDNER attended the meetings of the Fourth International Grassland Congress at Aberystwyth from July 15th–18th, and also the tour of grasslands in connexion with the Congress.

In the middle of July Mr. N. Y. SANDWITH joined an entomological expedition to British Guiana which was led by Dr. O. W. Richards of the Imperial College of Science. Seven weeks were spent in the Colony, a base being chosen at the Government rest-house at Mazaruni Station, near Bartica. From here Mr. Sandwith worked the neighbouring savannah and forest and also joined Mr. T. A. W. Davis, Assistant Conservator of Forests, in two short camping expeditions. A trip to the Kaieteur Fall was organized with the kind help of Mr. B. R. Wood, Conservator of Forests, and the party was able to spend a fortnight in this wonderful locality, making extensive collections on the savannah and in the forests of the gorge. At the beginning of October Mr. Sandwith, accompanied by Dr. J. Smart of the Department of Entomology, British Museum (Natural History), left for Tobago where he spent three weeks. He was joined for a few days by Prof. E. E. Cheesman of the Imperial College of Tropical Agriculture, Trinidad ; and at the end of the month he and Dr. Smart were entertained for five days by the Imperial College and, led by Sir Geoffrey Evans or Prof. Cheesman, were able to visit several interesting localities in Trinidad. They returned to London on November 18th. Mr. Sandwith's botanical collections reached a total of about 1000 numbers, including several duplicate sets, and spirit material of 150 species.

Mr. F. BALLARD spent three weeks at Copenhagen during the months of August and September. A large number of cultivated specimens of ferns were identified critically with the assistance of Dr. Carl Christensen and a number of taxonomic problems discussed. Various African collections in the Museum and in Dr. Christensen's own herbarium were also studied. A week-end was spent on the Baltic coast of Lolland in the south of Denmark at the invitation of the Danish Botanical Society and a number of plants were collected, including seed of about forty species.

The DIRECTOR, Dr. SPRAGUE, Dr. TURRILL, Mr. MARQUAND and Miss GREEN attended the Meeting of the British Association at Nottingham, and Dr. Turrill and Miss Green read papers.

Mr. E. Milne-Redhead left Kew early in September to spend five months in Northern Rhodesia as a guest of Captain K. R. Paterson of Matonchi Farm, Mwinilunga. Mr. Milne-Redhead is making an intensive collection in this very interesting botanical region.

Miss H. M. L. Forbes, Botanical Assistant in the Department of Agriculture and Forestry, S. Africa, who had been working at Kew for the past 18 months, paid an official visit during October to the following herbaria on the Continent : Paris, Geneva, Zürich, Vienna and Berlin. She studied the South African material of *Tephrosia* in connexion with her revision of the South African species of this genus.

The Director was invited by Indian botanists to attend the 25th Annual Meeting of the Indian Science Congress to be held in Calcutta from January 2nd to January 9th, 1938, as one of the members of the delegation of the British Association. With the concurrence of the Minister of Agriculture, the invitation was accepted and the Director left England on November 26th and reached Bombay on December 17th.

The Delegation was welcomed by the Vice-Chancellor of Bombay University and other leaders of science in Bombay, and proceeded by special train to Hyderabad where they were the guests of His Exalted Highness the Nizam for three days. The Osmania University was visited and particular attention was paid to the Botanical Department and to the magnificent new University buildings in course of erection. The famous Rock Temples at Ellora and Ajunta were also visited and the journey to Calcutta was continued via Sanchi, Agra, Delhi, Dehra Dun, Benares and Darjeeling. At Agra a visit was paid to Dr. Mehta's Rust Laboratory where he demonstrated convincingly that the rust damage is due to uredospore infection distributed from the Himalaya region and from the small wheat area in the Nilghiris—the latter being particularly harmful since the uredospores are disseminated at a time when the great wheat crop of central India is in its most susceptible condition. At Delhi the various departments of the recently built Imperial Agricultural Research Institute were studied in detail and Dr. Ventakaraman demonstrated his remarkable hybrids between sugarcane and bamboo, sugarcane and Sorghum and other grasses.

The magnificent Forestry Institute at Dehra Dun was thoroughly studied together with its Herbarium and fine collection of water-colour studies of the forest flora, as well as the excellent exhibits of timber and forest products in the Museums.

The Department of Botany, Benares University, and also the Agricultural and other Departments were visited, and the Director had the pleasure of meeting the Professors of Botany, Lecturers, Assistants and Students both here and at other university centres.

When at Darjeeling, visits were paid to the interesting Lloyd Botanic Garden and some work was done in the Herbarium. From there a visit was paid to the Cinchona plantations at Mungpoo, in the charge of Mr. P. V. Osborne and Mr. L. G. Richards from Kew. Mr. H. Thomas and Mr. G. H. Fothergill also came to Mungpoo from Munsong to meet the Director. The condition of the plantations was excellent and reflected the greatest credit on the work of the present Kewites and of their long line of predecessors. During this first part of his tour in India, in addition to the four Kewites in charge of the Cinchona plantations, the Director met Mr. E. Little, who has been for so many years in charge of the Government House Gardens at Poona and Bombay, and Mr. L. F. Ruse at Delhi.

PUBLICATIONS.—Ten numbers of the "Kew Bulletin" were published during the year, and the Review of the work during 1936 was issued as an Appendix. The "List of Seeds" was published as a separate pamphlet. "The Useful Plants of West Tropical Africa" (being an Appendix to the Flora of West Tropical Africa), by J. M. Dalziel, M.D., B.Sc., F.L.S., was published in March 1937 (K.B. 1937, 398).

Part 1, Volume 10 of the "Flora of Tropical Africa (part of the family *Gramineae*)" was published on May 21st.

"Overseas Plant Products" by J. H. Holland, which is based on work done while Mr. Holland was on the staff of the Museums, was published in August.

FILM.—A short film showing all phases of the work of the establishment was completed during the year by Short Film Productions Ltd., with the co-operation of the Director and other members of the staff. The film was first shown at a private performance attended by a number of distinguished scientists and has subsequently appeared at several London and provincial theatres.

The Gardens

GENERAL.—The first quarter's rainfall of the year exceeded that ever recorded for this period during the past 200 years. This increase was maintained throughout the year and resulted in an excess rainfall of 7·25 inches over 1936. No late spring frosts occurred and new planting was facilitated by the showery weather.

Despite the increase in water storage accommodation and in the rainfall, the water consumed was 24,086,000 gallons as against 22,800,000 in 1936.

VISITORS.—The number of visitors to the Gardens in 1937 was 1,164,249; weekdays (except students' days) 569,505; students' days 75,151; Sundays 519,593—an increase of 35,589 as compared with the figures for 1936. The greatest monthly attendance was in May with 271,711, and the lowest in December with 7,814. The highest daily attendance was 64,891 on Whit Monday, May 17th, the lowest was 6 on December 13th.

ARBORETUM.—The alterations carried out to the Bamboo Garden in 1935–6 were so successful that further division and transplanting were continued during 1937.

Further plants of *Elliottia racemosa* having been presented to the Gardens, it was found necessary to transplant one or two trees in the vicinity of the single existing specimen in order to ensure the best possible growing conditions.

In the Arboretum Nursery, the old wood batten and tiffany frames used to protect small seedlings have now been replaced by a permanent brick structure. The most important work in the nursery has been the experiments carried out in collaboration with Imperial Chemical Industries, Ltd., on the use of various chemicals to stimulate root formation on cuttings (see p. 549).

Owing to old age the last of the Shire horses had to be disposed of and was replaced by a young Suffolk Punch. The five horses forming the team are now all good class Punches. Stabling accommodation has been improved by the provision of a glass roof over the doors of the loose boxes.

TEMPERATE HOUSE.—The work of re-roofing the centre portion of the house, commenced in 1936, has been continued, and further sections of the north and south sides have been completed. For this work Canadian red cedar wood has been used and already a great improvement has been noticed in the general conditions for plant growth, especially in decrease of drip and in better lighting.

In the Himalayan section the soil in the Rhododendron beds has been renewed and the plants re-arranged. Many young specimens have also been introduced in the central section where replanting is proceeding.

Lobelia Gibberoa flowered again this year, and attained a height of 38 feet 6 inches. Other plants of botanical interest to flower were a new *Mahonia, M. lomariifolia*; the Chinese *Rhododendron, R. Kyawi*; *Kigelia Moosa*; *Dolichandrone platycalyx*; the two latter Bignoniads thrived particularly well under the cool conditions of the Temperate House. *Prostanthera Sieberi, Doryphora Sassafras,* and the new Chilian *Cassia stipulacea* have proved valuable decorative plants. Throughout the whole of December *Luculia gratissima* has been covered with its lovely, sweet-scented flowers.

Autumn fogs, far more numerous than usual, badly affected various plants and necessitated constant washing of the glass to ensure as much light as possible.

TROPICAL DEPARTMENT.—Palm House. Continuing the work done previously the whole of the south-west wing has been overhauled. The replacement of the dark tinted glass by clear panes and the repainting of the interior has provided better overhead conditions. The opportunity was taken to renovate the heating system in this section and the stages were brought forward in order to allow the provision of special beds for climbing plants between

the walls and the staging. The whole of the York paving forming the path on the north-west side has been turned and re-faced.

House 15.—A new sectional boiler was installed, thereby improving the heating system in this house.

" T " Range.—The experiments to remedy damage to plants caused by fogs are still in progress. New filtering apparatus for this work has been recently installed (see p. 549). The exteriors of Houses 7, 8 and 9 have been painted, and new double doors fitted to House 7.

Two new rain-water storage tanks have been constructed underground in the " T " Range yard.

The three saddle boilers in the stoke-hold have been replaced by one H sectional boiler provided with an electric circulating pump.

Melon Yard.—The chief matter of interest has been the experiments conducted with neon and mercury vapour lamps to combat damage by fogs and lack of light. These experiments, carried out in House 18a, are in their early stages and further investigation will be necessary before definite conclusions can be reached (see p. 549). In this connexion it is worthy of note that the plants that have suffered most this winter through lack of light, and fogs, are *Impatiens Hookeriana, Ruellia macrantha, Reinwardtia tetragyna, Eranthemum Wattii, Crossandra undulifolia, Plumbago rosea,* and many *Begonia* species.

Houses 17c and 18a, b. and c. have been rebuilt in Canadian red cedar wood. In 17c alterations were made to the heating system, an overhead flow-pipe being connected to the existing return. A new rain-water tank was installed in this house.

A new greenhouse, No. 18i, has been constructed on the site of the old span-roofed frame in front of the potting shed. To increase the amount of rain-water storage two further tanks have been built.

Ferneries.—On the south-west end of House 5 two new sets of double doors have been fitted.

Of special interest in the Tropical Department during the year has been the setting of two fruits on *Carica Papaya* ; 12 cocoa pods on *Theobroma Cacao* ; 12 fruits on the Metford lemon and 9 grapefruits on *Citrus paradisi*. The two most noteworthy plants to flower were *Hippeastrum procerum* and *Agave striata*.

Herbaceous Department.—The staging in House 25 has been replaced by the new type of concrete bench which allows a greater depth of shingle. A number of the old frames in the Propagating Yard have been replaced by new span frames, of which half are heated.

In the Rock Garden several small alterations have been made and the pathway originally leading into the Iris Garden has now been diverted to the south-west corner, allowing the construction of a new sheltered bay facing south.

Amongst the most interesting plants which flowered during 1937 were: *Colchicum triphyllum*, *Stachys villosa* var. *saxicola*, and *Fritillaria glauco-viridis* from Morocco, collected by Mr. E. K. Balls; *Nomocharis meleagrina*; *Linaria delphinioides*; *Campanula Piperi*; *Stanleya pinnata*; *Cyananthus integer*; *Salvia taraxacifolia*, collected by Mr. J. Gattefossé in the Atlas Mountains of Morocco; *Iris Barmunae*, *I. Embankiana*, *I. paradoxa*, *I. Polakii*, and *Anemone biflora* collected by Mr. A. C. Trott, Tehran, Persia.

Decorative Department.—In the autumn the circular bed with the large flower vase and stone edging at the end of the Broad Walk nearest the pond was replaced by a bed 20 feet in diameter bordered by a grass verge 12 feet wide.

The various flower beds adjoining the north-west corner of the pond have been re-designed and some new beds constructed.

Student Gardeners.—The steady improvement in the movements of students shown in recent years has been well maintained, the number of men (20) who completed their training being five more than in 1936. All these men secured appointments on leaving the Gardens.

Outgoing Students.—Of the appointments secured at home, six were in nurseries or private gardens and the same number in parks departments; one obtained a post under the Wimbledon Borough Council as Horticultural Instructor, one entered the General Post Office (Engineering Department), one returned to Canada, one to South Africa, and one proceeded to Reading University. Three overseas appointments—the same number as last year—were to the Botanic Gardens, Singapore, the Department of Agriculture, Bermuda, and Rumania (private garden).

Incoming Students.—Twenty men were admitted for instruction and training and were recruited as follows: Parks Departments (seven); nurseries and private gardens (seven); Government House, Falkland Islands (one); Armstrong College, Newcastle-upon-Tyne (one); Royal Hospital, Chelsea (one); John Innes Horticultural Institution (one); Botanic Garden, Cambridge (one); Agricultural School, Mikveh-Israel, Palestine (one).

Under exchange arrangements nine men proceeded to botanical and horticultural establishments overseas, viz.: La Mortola, Italy; State Horticultural School, Vilvorde, Belgium; Botanic Gardens at Berlin, Göteborg, Hamburg, Munich and New York; Luxembourg Gardens, Paris, and the Department of Public Works, Pretoria, South Africa.

Ten students, one from Austria, one from University College, Dublin, one from Germany, four from Holland, one from South Africa, one from Sweden, and one from Turkey, were permitted to work in the Gardens as voluntary students for varying periods.

Rainfall Record.—Rainfall recorded at the Royal Botanic Gardens, Kew, during 1937:—

	Inches.		Inches.
January	3·68	July	·77
February	3·95	August	3·01
March	2·85	September	1·81
April	2·10	October	2·39
May	2·27	November	1·42
June	1·82	December	3·61

Total 29·68 inches.

The total for 1936 was 22·43 inches.

WATERFOWL.—The following presentations of ducks have been most kindly made to the Gardens during the past year :—

10 Fulvous Tree ducks, by Mr. A. Ezra, Foxwarren Park; 6 Black-billed tree ducks, 2 Madagascar White-eye ducks, and 2 Muscovy ducks by Monsieur J. Delacour, Clères, France; and 5 Muscovy ducks by Mrs. Watson, Halsey Cottage, Normandy, Surrey.

Among the birds bred in the Gardens during 1937 were 5 Carolina ducks and 3 Magellan geese. Two Chinese geese, 5 Common Pochards and 2 Mallards were also reared in the duck pens. One pair of Cinnamon Teal were received in exchange from Messrs. McLean and Wormald, Norfolk.

CONTRIBUTIONS TO THE GARDENS, 1937.—The following is a summary of the items of most interest amongst the 960 separate consignments of plants, bulbs, seeds, etc., received during the year :—

Special consignments intended for the Empire Exhibit, Chelsea Show, were received from the following :—

Australia, Royal Agricultural & Horticultural Society, Adelaide; Canada, Central Experimental Farm, Ottawa; Ceylon, Botanic Gardens, Peradeniya; Gambia, Department of Agriculture; Gold Coast, Department of Agriculture; Grenada, Colonial Secretary; Hong Kong, Colonial Secretary; India, The Royal Agri-Horticultural Society, Calcutta; Kenya, Mount Elgon Nurseries, Kitale; Nigeria, Department of Agriculture; Nyasaland, Department of Agriculture; St. Helena, Department of Agriculture and Forestry; Seychelles, Department of Agriculture; Singapore, Botanic Gardens; Trinidad, Botanic Gardens; Zanzibar, Department of Agriculture; Major A. A. Dorrien-Smith, Tresco Abbey, Isles of Scilly; Mr. Amos Perry, Enfield.

Public Institutions :—

Amani, East African Agricultural Research Station.—Seeds.

Arnold Arboretum, including the Atkins Institution.—Seeds, including *Elliottia racemosa*.

Berlin, Botanic Garden.—Seeds, fern spores, and plant of *Correa speciosa* var. *cardinalis*.

Bermuda, Department of Agriculture.—Two cases of bulbs of *Lilium Harrisii*.

British Guiana, Forest Department.—Seeds of *Strychnos toxifera.*

British Museum (Natural History).—Seeds collected by Capt. Sherriff and Mr. Ludlow in S.E. Tibet.

Cambridge, Botanic Garden.—Plants, seeds and cuttings.

Canton, Sun Yatsen University.—Seeds.

Chelsea Physic Garden, London.—Plants and seeds.

Christchurch, New Zealand, Botanic Garden.—A collection of seeds.

Darjeeling, India, Lloyd Botanic Garden.—Seeds of Eastern Himalayan plants.

Dunedin, New Zealand, Botanic Garden.—Seeds.

Edinburgh, Royal Botanic Garden.—Plants, including *Coleus, Darlingtonia, Drosera, Iris, Paeonia, Primula, Restio* spp., *Welwitschia Bainesii* Carr. and various seeds.

Geneva, Jardin botanique.—Seeds.

The Hague, Public Parks.—A collection of trees and shrubs.

Hyde Park, London.—Plants, including a collection of hardy Primulas and seeds, including a collection by Colonel Bailey from Nepal.

Hong Kong, Botanical and Forestry Department.—Plants and seeds.

John Innes Horticultural Institution, Merton.—Plants of *Streptocarpus* sp., a collection of hybrid Calceolarias, and seeds.

Kiel, University Botanic Garden.—A collection of plants including *Lithops, Pleiospilos, Rimaria, Titanopsis, Cotyledon, Echeveria* and *Pelargonium* spp.

Kimberley, McGregor Memorial Museum.—Seeds.

Kirstenbosch, Bolus Herbarium.—Plants, including species of *Ruschia, Conophytum, Anacampseros, Mesembryanthemum,* also plants of *Opthalmophyllum Friedrichiae* and *Lapidaria Margaretae,* collected by Mr. A. F. Bayer.

Kirstenbosch, National Botanic Gardens.—Seeds.

Nanking, Botanic Garden, Sun Yatsen Memorial Park.—Seeds.

New York Botanical Garden.—Plants, including a collection of succulents from Mexico and *Clematis* spp. Seeds from the Rocky Mountains Expedition.

Nigeria, Conservator of Forests.—Seeds of *Hydnocarpus Wightianus.*

Nigeria, Director of Agriculture.—Pods of *Theobroma.*

North Borneo, Director of Agriculture.—Banana suckers.

Ottawa, Central Experiment Farm.—Budwood of *Rosa* spp. bulbs of *Lilium* spp., and several consignments of seeds.

Palermo, Orto botanico.—Offsets of *Agave* spp., and a collection of seeds.

Panama, Canal Zone Experiment Gardens.—Cuttings of *Lonchocarpus Nicou.*

Port Elizabeth, Parks and Town Attractions Department.—A collection of trees, orchids and succulents. Seeds of *Oldenburgia arbuscula.*

Pretoria, Division of Plant Industry.—Plants of *Streptocarpus Pole-Evansii* and several consignments of seeds.

Reading University, Botany Department.—A collection of liverworts.

St. Helena, Agricultural and Forestry Officer.—A consignment of bulbs of *Lilium longiflorum* var. *eximium*.

Somaliland, Veterinary and Agricultural Department.—A collection of Stapelias.

Stellenbosch, University Botanic Gardens.—Bulbs of *Haemanthus pumilis* and *Ammocharis falcata*. Seeds and corms of *Gladiolus Bolusii* and a collection of seeds.

Summerland, Canada, Dominion Experimental Farm.—A collection of native plants from the Okanagan Valley.

Swansea Parks.—Plants, cuttings and seeds.

Trinidad, Department of Agriculture.—Plants, including a collection of orchids, and seeds.

Uganda, Department of Agriculture.—Plants of *Leptaspis cochleata* and *Bulbophyllum platyrhachis*.

Washington, U.S. Department of Agriculture.—Tubers of *Colocasia* and *Xanthosoma* spp. Several consignments of seeds, including *Regnellidium diphyllum*, *Agropyron* and *Lespedeza* spp.

Wisley, Royal Horticultural Society's Gardens.—Plants, including a collection of alpines, seeds and bulbs.

Private Donors :—

Lord Aberconway, Bodnant, Tal-y-Cafn.—Plants, cuttings and seeds, including a collection from Eastern Yunnan.

Mr. A. W. Anderson, Timaru, New Zealand.—Seeds.

Mr. G. P. Baker, Kippington, Sevenoaks.—Plants and seeds.

Messrs. Baker Bros., Texas.—A collection of plants, including *Lonicera*, *Biota*, *Cupressus* and *Lantana* spp.

Col. C. Beddington, London.—Seeds and cuttings.

Dr. R. Bevan, Henley-on-Thames.—A collection of plants.

Mr. S. Boothman, Maidenhead.—Plants and seeds.

Mr. S. W. McLeod Braggins, Bordighera, Italy.—Seeds.

Mrs. A. S. G. Brown, London.—A collection of stove and greenhouse plants.

Chandra Nursery, Sikkim, India.—Seeds.

Sir Jeremiah Colman, Gatton Park.—Plants, including a collection of orchids.

Donard Nursery Co., Newcastle, County Down.—A collection of greenhouse plants from the Empire Exhibit, Chelsea, and a collection of shrubs.

Mr. C. D. Donoghue, Ilford.—A collection of Haworthias.

Messrs. Duncan & Davies, Ltd., New Plymouth, New Zealand.—Plants and seeds.

Messrs. C. Engelmann, Ltd., Saffron Walden.—Plants and seeds.

The Forestal Land, Timber and Railways Co., Ltd., London.—Seeds collected in Argentine and Chaco by Señor T. Meyer.

Mr. W. Arnold Forster, St. Ives.—Seeds.
Dr. H. G. F. Fourcade, Humansdorp, Union of South Africa.—A collection of succulents.
Mr. A. V. Giblin, Hobart, Tasmania.—Seeds.
Mr. B. J. Gould, Sikkim.—Plants of *Rheum inopinatum*, cuttings and seeds from Sikkim and Tibet.
Mr. S. H. Griffin, Churt.—A collection of succulents.
Lord Hartington, London.—Seeds, including a collection from Tasmania.
Messrs. Hillier & Sons, Winchester.—Plants, including some from the Chelsea Empire Exhibit, and a collection of shrubs.
Mr. G. B. Hinton, Mexico.—Plants of orchids, tubers of *Dahlia* sp., and many consignments of seeds.
Miss I. W. Hutchison, Kirkliston.—A collection of seeds from the Aleutian Islands and the Japanese Hills.
Major L. Johnston, Hidcote Manor, Campden.—A collection of plants and cuttings, bulbs of *Nerine* and seeds.
Mr. D. R. Keith, Stegi, Swaziland.—A collection of succulents.
Mr. J. W. King, Kettering.—A plant of *Crataegus oxyacantha* bearing mistletoe.
The Knap Hill Nursery, Woking.—A collection of *Sorbus* spp., Azaleas and *Nothofagus* spp.
Mr. W. A. Knight, St. Augustine, Fla., U.S.A.—Five plants of *Elliottia racemosa*.
Mr. C. H. Lankester, Costa Rica.—Several consignments of plants and seeds.
Mr. B. Levy, Wankie, S. Rhodesia.—Plant of *Ceropegia* sp. and several batches of seeds.
Miss N. Lindsay, Abingdon.—Plants and cuttings, and a collection of bulbs, corms and seeds from Persia.
Mr. E. H. McCulloch, Mosman, New South Wales.—A case of bulbs of *Amaryllis Belladonna*.
Mr. F. W. Millard, East Grinstead.—Seeds and plants, including a collection of alpines.
Lord Moyne, London.—A collection of orchids.
Major A. Pam, Broxbourne.—Seeds and plants, including *Pamianthe*, *Alstroemeria*, *Clematis*, *Genista* and *Hippeastrum* spp.
Major P. Pechell, Odiham.—A collection of orchids.
Dr. von Poellnitz, Oberlödla, Germany.—A collection of Haworthias and plants of *Gasteria Schweickerdtiana*.
The Prime Minister (The Right Hon. Neville Chamberlain, M.P.).—A collection of orchids.
Mr. D. Pringle, Port Elizabeth, Union of South Africa.—A collection of Stapelias.
Dr. W. Rama, Madagascar.—Orchids, including fine specimens of *Cymbidium rhodochilum*.
Mr. D. M. Reid, Harrow.—Seeds of Bacuri.
Dr. E. Reuter, Helsingfors, Finland.—Seeds.

Mr. Lionel de Rothschild, Exbury.—Plants, cuttings and seeds of *Erica* spp.

Messrs. L. R. Russell, Ltd., Windlesham.—Seeds of *Hevea brasiliensis* and plant of *Cryptanthus acaulis* var. *Russellii*.

Hon. Mrs. E. F. Ryder, Beaulieu.—Plants and seeds.

Mr. F. D. Stewart Sandeman, Kingennie, Angus.—Plants of *Primula* spp.

Messrs. Sanders (St. Albans), Ltd.—Orchids.

Dr. R. Seligman, Wimbledon.—Plants and seeds.

Mr. H. B. Sharpe, Rumuruti, Kenya Colony.—Plants, cuttings and seeds of *Caralluma*, *Stapelia* and *Edithcolea* spp.

Mr. W. G. Sheldon, Oxted.—A collection of seeds from Addis Ababa.

Messrs. W. C. Slocock, Woking.—Plants of Rhododendron and a collection of elm, apple, cherry, rose and lime stocks.

Mrs. Smith, Leigh-on-Sea.—A collection of orchids.

Major F. C. Stern, Goring-by-Sea.—Plants and cuttings.

Mr. H. L. Stinson, Seattle, Washington.—Seeds of *Delphinium*, *Mertensia* and *Aquilegia* spp.

Mr. A. J. Symons, Jersey, Channel Islands.—A collection of *Achimenes*.

Mr. A. C. Trott, Tehran.—Bulbs and seeds from Iran.

Messrs. Robert Tucker & Co., London.—A collection of bulbs from Bermuda.

Mr. T. G. Tutin, Cambridge.—Seeds.

Mr. F. A. Weinthal, Roseville, New South Wales.—A collection of orchids; seeds of *Drosera peltata*.

Mr. J. W. Wyatt, London.—Seeds from New Zealand and the Tasmanian Alps.

Distribution of Plants and Seeds.—At the commencement of the year, the annual distribution of seeds resulted in 199 separate consignments being despatched, comprising 5703 packets of herbaceous plants and 4120 packets of trees and shrubs. The aggregate shows a decrease of 155 packets as compared with the year 1936.

Special distributions were made of the following seeds:—*Agave lechuguilla*, *Leucadendron argenteum*, *Lespedeza* sp., *Ammocharis longifolia*, *Elliottia racemosa*, *Primula* spp., *Rheum* sp., and *Rhododendron* spp. The following seeds harvested at Kew were distributed, in addition to those mentioned above:—*Aesculus indica*, *A. californica*, and *Davidia Vilmoriniana*.

Recipients of plants, etc., included the following:—

Institutions:—

Amsterdam, Botanic Garden.—Plant of *Clivia nobilis*.

Amani, East African Agricultural Research Station.—Aquatics.

Armstrong College, Newcastle-upon-Tyne.—Economic plants.

The Benmore Trustees, Dunoon, Argyll.—A collection of Mexican oaks.

Berlin, Botanic Garden.—Hardy trees and shrubs.
Burnley, Parks Department.—Hardy trees and shrubs.
British Legion Poppy Factory, Richmond.—A collection comprising 124 trees and shrubs.
Bristol University, Department of Botany.—A collection of ferns.
Cambridge, Botanic Garden.—Alpine, herbaceous and stove plants including *Brownea Crawfordii* ; tubers of *Nymphaea* spp.
Cambridge, King's College.—*Camellia Sasanqua.*
Cap D'Antibes, Centre de Researches Agronomiques de Provence. —*Funkia* spp.
Cape Town, Public Works Department.—Seeds of *Aesculus* spp.
Chelsea Physic Garden, London.—A collection of greenhouse and herbaceous plants.
Chicago, University of Chicago.—A collection of cycads.
Civil Service Sports Ground, Chiswick.—A collection of hardy climbers.
Edinburgh, Royal Botanic Garden.—Plants and seeds.
Exeter, University College of the South West.—Economic plants.
Feltham, H.M. Borstal Institution.—A collection of trees.
Giza, Egypt, Ministry of Agriculture.—A Wardian case of mangoes transhipped from Trinidad, B.W.I.
Glasnevin, Botanic Gardens.—Seeds of *Exacum macranthum.*
Green Cross Society, London.—Seeds of British native plants.
The Hague, Public Parks.—Seeds, plants and grafts of hardy trees and shrubs.
Hakgala Botanic Garden, Ceylon.—A collection of *Nymphaea* spp.
Hampton Court.—Plants and seeds of *Rosa* spp.
Hyde Park, London.—Trees and shrubs.
Ibadan, Nigeria, Department of Agriculture.—Wardian cases of cacao seedlings grown from Trinidad seeds.
John Innes Horticultural Institution, Merton.—Plants, including *Tolmiea Menziesii.*
Kew, Ministry of Labour.—A collection of hardy shrubs.
Khartoum, Government Gardens.—A Wardian case of decorative plants.
Kiel, Botanic Garden.—*Conophytum* spp.
Kirstenbosch, National Botanic Garden.—Plants, including *Passiflora racemosa, Beloperone guttata.*
Kornik, Poland, Gardens and Arboretum.—Plants and grafts of hardy trees and shrubs.
McGill University, Montreal.—A collection of seeds of trees, shrubs and herbaceous plants.
Ministry of Labour Social Service Association (for the village of Escombe, Co. Durham).—A large collection of trees and shrubs.
Moscow, Botanic Garden.—Seeds of *Victoria regia.*
Moshi, Tanganyika Territory, Coffee Experimental Station.—A Wardian case of decorative and economic plants.

Napier, New Zealand, Parks Department.—A collection of plants and seeds of trees and shrubs for replanting the earthquake zone of the town of Napier.

New York Botanical Garden.—Seeds of *Victoria regia* and plants of *Begonia* spp.

Nottingham, University College.—A collection of trees, shrubs and herbaceous plants.

Ravenscourt Park, London, W.6.—Herbaceous plants.

Riga, Botanic Garden.—A collection of *Begonia* spp.

Rostov-on-Don, Botanic Garden.—Seeds of *Victoria regia*.

St. Helena, Agricultural and Forestry Office.—Seeds of *Agave lechuguilla* and a collection of decorative plants.

St. Mary's Hospital (Inoculation Department), London.—Plants of *Humea elegans*.

Saratov State University.—52 packets of grass seeds.

Seychelles, Department of Agriculture.—Seed and tubers of *Nymphaea* spp.

Soldiers', Sailors' and Airmen's Families Association.—A collection of Dahlias.

Swansea Parks Department.—A large collection of greenhouse and hardy plants.

Trinidad, B.W.I., Department of Agriculture.—Plants of the small-sized Brazil nut (*Bertholletia excelsa*).

Trinidad, B.W.I., Imperial College of Tropical Agriculture.—Banana suckers.

Rijks Arboretum, Wageningen, Holland.—*Crataegus* spp.

U.S. Department of Agriculture, Washington.—Plants and seeds, including *Rosa ecae*, hardy trees and shrubs.

Windsor Great Park.—A collection, comprising 390 hardy trees and shrubs.

Wisley, Royal Horticultural Society's Gardens.—A collection of alpines including *Primula Rockii*.

Zoological Society of London.—Trees, shrubs and stove plants.

Private Recipients :—

The Rt. Hon. Lord Aberconway, Bodnant.—Seeds and plants of *Alstroemeria* spp.

Mr. F. R. S. Balfour, Dawyck.—A collection of orchids, miscellaneous trees and shrubs.

Dr. R. Bevan, Henley-on-Thames.—Alpines.

Viscount Bledisloe, Lydney Park, Glos.—*Aesculus indica*.

Mr. E. A. Bowles, Waltham Cross.—Herbaceous plants.

Brookside Nurseries, Ltd., Oxford.—Grafts and cuttings of hardy trees and shrubs.

Messrs. Burkwood & Skipwith Ltd., Kingston-on-Thames.—Seeds and plants, including *Olearia Gunniana*.

M. J. Cardon, Meirebeke-lez-Gand, Belgium.—A collection of stove plants and orchids.

The Rt. Hon. Sir Austen Chamberlain, K.G.—*Magnolia Soulangiana.*

Mr. C. J. Chamberlain, Chicago.—Cycads.

Mr. W. S. Chamberlain, Hampton-on-Thames.—A small collection of plants including *Phyllocactus Cooperi.*

Col. Stephenson Clarke, Cuckfield.—*Quercus incana.*

Hon. Mrs. P. Spender-Clay, Dormans.—Bulbs of *Lilium* spp.

Sir Jeremiah Colman, Gatton Park.—Orchids, including *Cymbidium rhodochilum*, and *Nepenthes* spp.

Mr. W. Corbett, Swanley.—Seeds of *Asparagus* spp.

Lady Currie, Aldbourne.—*Pelargonium* spp.

Dartington Hall, Totnes.—Plants and seeds.

Lord Decies, Falfield, Glos.—A collection of Mexican oaks.

M. J. Delacour, Clères, S.I., France.—*Aristolochia ridicula* and *A. Sturtevantii.*

Donard Nursery Co., Newcastle, Co. Down.—A collection of *Magnolia* spp.

Mr. S. Duruz, Wallington.—Alpines, including *Primula Forrestii.*

Lady Thiselton-Dyer, Bere Alston.—Hardy plants.

Mr. C. Eley, East Bergholt.—Plant of *Camellia saluenensis.*

Mr. J. Etherington, Purley.—Seeds of hardy trees and shrubs.

Mr. W. Arnold Forster, St. Ives.—Plants of *Camellia hongkongensis.*

Mr. Howard Fyfe, New York.—Hardy bamboos.

Messrs. R. Gill & Sons, Falmouth.—Collection of trees, shrubs and greenhouse plants.

Commander F. Gilliland, Londonderry.—A collection of trees and shrubs.

Mr. A. R. Goodwin, Kidderminster.—Seeds and plants of *Primula* spp.

Mr. B. J. Gould, Sikkim.—A collection of seeds of alpines.

Col. C. H. Grey, Hocker Edge, Cranbrook.—Seeds and plants, including *Pratia begonifolia.*

Mrs. M. Grieve, Chalfont St. Peter.—Plants of wild chicory.

Sir Cecil Hanbury, La Mortola.—A collection of *Quercus* spp.

Messrs. Hillier & Sons, Winchester.—Plants, grafts and cuttings of hardy trees and shrubs.

Messrs. Geo. Jackman & Son, Woking.—Grafts and cuttings of hardy trees and shrubs.

Major L. Johnston, Hidcote Manor, Campden.—Greenhouse plants, and trees and shrubs.

Knap Hill Nursery, Ltd., Woking.—Plants, seeds and cuttings of hardy trees and shrubs.

Mr. C. H. Lankester, Costa Rica.—Succulents and orchids.

Messrs. Laxton Bros. (Bedford) Ltd.—Grafts of *Cerasus Sargentii* and hardy trees and shrubs.

Mr. H. Q. Levy, Jamaica.—A collection of *Dendrobium* spp.

Miss N. Lindsay, Abingdon.—Plants and seeds.

Mr. R. H. Macaulay, Kirnan, Argyll.—Plants and seeds of alpines.

Lt.-Col. L. C. R. Messel, Haywards Heath.—Collection of *Ceanothus* spp.

Major A. Pam, Broxbourne.—Plants, including *Hippeastrum reticulatum*, and *Haemanthus Katherinae*.

Miss L. F. Pesel, Winchester.—A consignment of 4750 cuttings of hardy shrubs, for the use of the Roads Beautifying Association.

The Rt. Hon. the Earl of Powis, Welshpool.—A plant of *Vitex Agnus-castus*.

Mr. L. F. Randolph, Ithaca, N.Y.—Collection of *Iris*.

Dr. J. E. H. Roberts, London.—Alpines.

Mr. Lionel de Rothschild, Exbury.—A collection comprising 78 packets of seeds from Sikkim.

Messrs. L. R. Russell, Ltd., Windlesham.—Stove plants, including *Nepenthes* spp.

Messrs. B. Ruys, Ltd., Dedemsvaant, Holland.—Alpines.

The Hon. Mrs. E. F. Ryder, Beaulieu.—Miscellaneous plants and bulbs.

Messrs. Sanders (St. Albans), Ltd.—Orchids.

Mrs. D. E. Saunders, Farnborough, Kent.—Plants and seeds of alpines.

Messrs. W. C. Slocock, Ltd., Woking.—Plants and cuttings of hardy trees and shrubs.

Major A. A. Dorrien-Smith, Tresco.—Seed of *Kniphofia Rogersii*.

The Rt. Hon. the Earl of Stair, Stranraer.—A collection of Mexican oaks.

Major F. C. Stern, Goring-by-Sea.—Seeds of *Kniphofia Rogersii*, and hardy trees and shrubs.

Mr. A. J. Symons, Jersey, Channel Islands.—A collection of *Achimenes*.

Prof. F. Tobler, Dresden.—Plants of *Alocasia* spp., and *Aphelandra Fascinator*.

Messrs. R. Wallace & Co., Tunbridge Wells.—Bulbs of *Lilium Brownii* var. *Colchesteri*.

Major H. F. Ward, Nairobi.—A collection of plants, including *Pavonia rosea* and *Scutellaria costaricana*.

Capt. G. Warre, Roquebrune, A.M., France.—Plants, including *Correa* spp., and *Jasminum rex*.

Messrs. John Waterer, Son and Crisp, Ltd., Bagshot.—Plants and grafts of hardy trees and shrubs.

Dr. J. Cromar Watt, Aberdeen.—*Camellia japonica* var. *magnoliiflora*.

Mr. A. G. Weeks, Limpsfield.—Seeds of alpines.

Mr. F. A. Weinthal, Roseville, N.S.W.—Plants of *Cattleya* and *Cymbidium* hybrids.

Mr. E. Whitney, Groombridge.—Plants of *Puya alpestris*.

Bedgebury Pinetum

Tree growth was, on the whole, very satisfactory during the year, but there are a few species and varieties of several genera that are still stunted.

The beneficial results of cleaning out ditches and drains during and since the laying out of the Pinetum were very noticeable in the early part of the year, for despite a very heavy rainfall throughout the winter and spring, areas that were water-logged ten years ago remained reasonably dry. However, the heavy rainfall made the ground cold, and although there was no prolonged period of frost in winter, almost all kinds of trees were late in breaking into growth, and fortunately there were no injuries from late spring frosts. A sunny summer and early autumn resulted in well-ripened wood, which was uninjured by rather severe frosts that occurred between the middle of November and late December.

The rainfall for the year amounted to 40·69 inches, January being the wettest month with 6·78 inches and July the driest month with ·87 inch. The highest fall on one day was 2·06 inches on August 13th. The coldest night during the early part of the year was March 10th, when 22 and 21 degrees of frost were registered on the ground in low, wet places. In the screen 13 degrees of frost were registered on the same night. In autumn 21 degrees of frost were recorded on the ground in two low, wet places, and 12 degrees of frost were registered in the screen on the same night. As in past years, the difference in temperature between low, wet places and higher ground a few hundred yards away was very marked. The difference is usually 4 or 5 degrees but it is sometimes as much as 8 degrees.

During the summer the Forestry Commission decided that a belt of trees about five chains wide, surrounding the greater part of the Pinetum, should be subjected to special management in order to preserve the amenities of the place and provide the necessary shelter. The Office of Crown Lands has transferred to the Pinetum an area of a little over three acres of open land adjoining the Pinetum for planting with decorative trees, on which a further trial may be made with species and varieties that have not grown well in their original positions. A similar area of coppice adjoining the open ground has been transferred to the Forestry Commission in order that both amenities and shelter may be insured in a position where woodland merges into open fields.

The practice adopted two or three years ago of planting broad-leaved trees among the conifers, to aid in the improvement of the soil, has been continued, the necessary trees being sent from Kew. In 1935 two additional acres of land were added to the Pinetum, whereon to plant a good many unnamed Chinese species of *Abies* and *Picea*, and certain trees that had not grown well where they were first planted. The young trees were badly crippled by frost soon after they were planted and they grew very little in 1936.

However, they became well established during the favourable summer of 1937 and many have formed good leading shoots.

There has been the usual trouble through honey fungus which killed fifteen trees, and there has been some trouble with green aphis on spruce.

The Museums

As in former years, routine work connected with correspondence took up a considerable amount of time. The unsettled conditions in Spain and China caused enquiries to be made regarding the medicinal species of the genus *Ephedra*, and the possibility of the cultivation on a commercial scale in this country of tarragon (*Artemisia Dracunculus* L.), has been brought forward on several occasions. The now popular game of darts has brought several enquiries for information as to suitable fibres for the making of the better types of dart-board, and samples and information have been supplied to manufacturers.

A number of lavenders grown in this country for the distillation of essential oil were received for examination and all were found to be forms of the hybrid *Lavandula latifolia* Vill. × *L. officinalis* Chaix. A sample of "peppermint" from the Argentine, with a high oil-content, proved to be a species of *Mintostachys*.

Several collections of plant-remains from Egyptian excavations have been received for identification (see also Jodrell Laboratory report), some in a remarkably good state of preservation. Notable examples were some castor-oil seeds (circiter 3500 B.C.) on which the characteristic mottling of the seed coat was still clearly visible; this is especially remarkable in view of the soft nature of the seed.

A collection of fruits and pieces of wood recovered from the gravels of the Ankobra River, Gold Coast, probably of late pleistocene to recent age, were found to be largely the same as existing forms.

Many additions to the newly-formed herbarium of economic plants were made during the year, including a collection of adventive weeds by Mr. R. L. Smith, Cardiff. It is felt that plant-products exhibited in the Museums, and particularly timbers, should have corresponding herbarium specimens as a check on the determinations. Such are now being asked for from correspondents desiring exchanges and the results so far have been encouraging, particularly from the United States of America.

The work of checking and adding to the arboretum herbarium has been continued, the arrangement of the species of several genera being changed from alphabetical to taxonomic in order to facilitate determinations. A large number of additions have been made during the year, mainly from the gardens, and specimens have been contributed by Mr. A. B. Jackson.

Owing to excessive crowding many of the bottles of small seeds and the small timber specimens are being extracted from the cases of No. 1 Museum and stored elsewhere as reference collections. The seeds have been arranged systematically in the office of the

Museum and the small timbers will be displayed similarly on shelves in the hall of Museum No. 4. The relabelling of exhibits in No. 1 Museum has been continued and two floors are now almost completed.

Some exhibits of special interest to the general public have been shown in No 3 Museum, which is nearest the main gate and attracts most visitors. All the smoking pipes and the walking sticks scattered throughout the systematic collections in No. 1 Museum are now being shown separately. Notable additions to No. 3 Museum are two wood pictures kindly lent by the makers, Messrs. Richard Graefe Ltd., of High Wycombe. One, representing a view of the City of Benares on the Ganges, a duplicate of that supplied for the decoration of the ship of that name, measures 9½ ft. by 6½ ft. The number of veneers used in this picture is 25, only a few being artificially coloured, and the effect is very remarkable.

Through the kindness of two firms, Messrs. Heal and Son, Tottenham Court Road, and Paul and Marjorie Abbatt, Wimpole Street, sets of children's toys, made mostly of plain wood, were lent for exhibition during the Christmas holiday period.

Members of the Museum staff continue to serve on the Consultative Committees of the Imperial Institute and the Crude Drugs Sub-committee of the British Pharmacopoeia Commission.

Publications.—Tephrosia macropoda as a possible Insecticidal Plant (K.B. 1937, 510).

On Elm Seedlings (Quart. Journ. Forestry, **31**, No. 4 : 1937).

The Accurate Definition of Leaf Shapes by Rectangular Co-ordinates (Ann. Bot., N.S., **1**, 4 : 1937).

Presentations to Museums :—Paul and Marjorie Abbatt Ltd., London : educational wooden toys, on loan.

Beacon Brushes, Ltd., Bucks. : fibres used for brush-making.

Botanic Garden, Braunschweig : 21 packets of seeds.

Mr. E. G. Bryant, S. Africa : fruits of *Harpagophytum procumbens* and *Acacia Giraffae*.

Mr. S. H. Chantry, Kew : wood specimen.

Chiswick Products, Ltd. : sample of purified " uricuri " wax.

Mr. F. H. Chittenden, R.H.S. : fruits of lemon-orange graft hybrid.

Major V. B. D. Cooper, London : dried stems and prepared fibre of *Asclepias incarnata*.

Mr. H. A. Dade, Kew : pod of an uncommon type of Amelonado cacao.

Mr. W. Dallimore, Tunbridge Wells : timber specimen.

Dr. Fourcade, S. Africa : everlasting flowers.

Mr. A. J. Gibson, London : sample of " yeast flowers."

Mr. J. S. L. Gilmour, Kew : photographs of Nigerian industries.

Messrs. R. Graefe, Ltd., High Wycombe : pictures made of wood, on loan.

Messrs. Hall and Co., Transvaal : specimens of *Nephelium Litchi*.

Messrs. Heal and Son, London : wooden toys, on loan.

Mr. N. B. Helmsing, Hull : wood specimens.

Prof. F. Kirchheimer, Germany : fossil seed.

Mr. Leo R. Kische, U.S.A. : 16 hand specimens of N. American timbers.

Dr. R. Melville, Kew : wood specimens.

Dr. J. G. Parker, London : root of *Dioscorea rhipogonoides* Oliv., and leather and fabric tanned and dyed with it.

Mr. C. H. Robinson, California : 36 timber samples and herbarium material.

Mr. H. M. Sharpington, London : wood specimen.

Starch-Free Foods, Ltd., London : sample of " Profarin " flour.

Miss H. M. Smith, London : native musical instrument from the Cameroons, on loan.

Mr. R. L. Smith, Cardiff : 30 specimens of adventive weeds.

Messrs. Thomas Tait and Sons, Ltd., Scotland : tin of Esparto dust.

Mr. P. Topham, Nyasaland : pods of *Swartzia madagascariensis*.

Messrs. Tullis Russell and Co., Scotland : sample of Esparto wax.

Mr. A. Wade, Penwortham : reeds used as laths in an old ceiling.

The Wellcome Foundation, Ltd., London : replica of a medal, struck in honour of Dr. F. B. Power.

Mr. W. Wright, Waltham Abbey : sample of Indian " Sabai " grass.

The Jodrell Laboratory

The routine work, as usual, consisted in identifying miscellaneous botanical material by anatomical means. Most of the items examined were wood specimens from such varied sources as Brazil, San Salvador, India, New Zealand, Australia, and various parts of Africa. Apart from modern specimens, wood used in the construction of antique furniture in The Wallace Collection was examined, and also some from the tomb of Tut-ankhamun. An unusual item was a sample known as " peacock wood " which exhibited quite a pleasing " figure," but was found to consist of small fragments of walnut (*Juglans regia*) held together by glue. A few medicinal plants were also examined, and a fibre, stated to be used for making guncotton in Peru, consisted of hairs from one of the *Cactaceae*.

A considerable number of new microscopical slides has been incorporated in the collection, including sections of wood collected by the Assistant Keeper during a visit to the Cameroons with Dr. J. Hutchinson (see p. 530).

Work on the morphology and life history of *Ranunculus Ficaria* has been continued, and an account will shortly appear in the " Annals of Botany." It is hoped before long to complete a further article on this subject in collaboration with Mr. E. M. Marsden-Jones.

The laboratory has to an increasing extent become a centre for the scientific investigation of horticultural problems in collaboration with the gardens staff. Thus the work on the adverse effect of atmospheric pollution on greenhouse plants, which is especially noticeable in foggy weather, has been continued. This has confirmed the view, to which allusion was made in last year's report, that the sulphur acids present in the atmosphere, operating under suitable conditions of temperature and humidity, constitute the chief source of trouble. Attempts are being made to reduce the damage by preventing polluted air from entering the houses and also by supplying the plants with purified air. Experiments with artificial lighting are also being carried out on a larger scale than previously in an attempt to improve the health and capacity to produce flowers of plants which bloom in the dull or foggy winter months. Considerable assistance with this work has been provided by H.M. Office of Works.

Another subject being investigated in collaboration with the gardens staff is the use of chemicals, which, by their hormone-like action, stimulate root formation on cuttings of various plants. Considerable assistance on the chemical side has been provided by members of the staff of the Imperial Chemical Industries Agricultural Research Station at Jealott's Hill. This subject has recently commanded attention in so many quarters that a meeting of botanists, nurserymen and chemical manufacturers to discuss the matter was held at Kew in November by invitation of the Director (see Nature, 141, 88: 1938, and Gard. Chron. ser. 3, **103,** 93: 1938).

Manurial treatments for cacti are also being studied.

Dr. A. Clark and Mr. J. Pryde demonstrated the presence of prussic acid in the caeca of rats which had been fed on maize cobs, suggesting that this was produced by the decomposition of some substance present in the maize. This discovery is particularly important in connexion with the disease known as pellagra which is exhibited especially by people who live almost exclusively on a maize diet. It is hoped that an account of this work will shortly be published. Mr. J. Pryde also continued his researches on the nature of the chemical substances present in a number of different kinds of wood from South Africa. Mr. D. P. Watson completed his work on the structure and germination of some leguminous seeds, and was awarded an M.Sc. degree at London University for a thesis on this subject. Mr. J. Bausch completed an investigation of the anatomy of *Eucryphia* in relation to the disputed taxonomic position of the genus, and also assisted with some of the special investigations which were in progress during his visit. Other visitors were Miss W. M. Curtis (morphology and anatomy of *Taraxacum*), Mr. H. Muyser (structure of conifer needles) and Mr. J. E. Senaratna (anatomy of *Leptaspis*).

Drawing and Photography.—A number of photographs of Kew type specimens have been made for other institutions and several consignments of borrowed specimens have been photographed for our own collection.

Many living plants have been either photographed or drawn for the Kew records and a certain amount of work has been done for "Hooker's Icones Plantarum."

Drawings, graphs, maps and photographs have been prepared for various publications including the Kew Bulletin, the Journal of the Linnean Society, the Journal of the Royal Meteorological Society and the Annals of Botany.

A series of photographs illustrating the progress of the research work on the effects of atmospheric pollution has been started and will be supplemented from time to time.

Mrs. Manley, formerly Miss D. A. Chaytor (London), made the drawings for her "Taxonomic Study of the Genus Lavandula." Dr. D. P. Watson (Toronto) prepared a series of drawings for his work on seeds. A number of photomicrographs of seed coats was prepared on his behalf.

Other visitors to the Studio included Prof. Boyd Thomson (Toronto), Mr. J. Bausch (Holland), and Mr. W. J. Stokoe from Messrs. Frederick Warne & Co., Ltd., London.

The Herbarium

Europe, North Africa, and Orient.

10,596 numbers have been received for incorporation in this department of the Herbarium. This figure includes 6827 numbers received for identification or verification, but does not include single specimens or small parcels sent for determination. 10,970 sheets have been mounted and laid in.

Additions to the collections from the British Isles have been made by members of the Kew staff from Gloucestershire, Norfolk, Suffolk, Lincolnshire, Wiltshire, Westmorland, and Scotland. Miscellaneous British collections were received from Mr. G. O. Allen, Miss M. E. Edmonds, Mr. D. B. Fanshawe, Mr. G. T. Fraser, Mr. P. M. Hall, Mr. J. E. Lousley, Mr. F. K. Makins, Mr. H. S. Redgrove, Rev. H. J. Riddelsdell, Mr. H. N. Ridley, Mrs. C. I. Sandwith, Mr. A. L. Still, Mr. E. C. Wallace and Mr. C. H. Wright.

Mr. H. J. Goddard has continued his presentation of specimens from John Ralfs's Herbarium. The Botanical Society and Exchange Club of the British Isles presented a set of the plants received from its members.

The following important collections of plants (totalling over 2250 numbers) from the Balkan Peninsula have been presented during 1937 :—The first set of the large collection made by Mr. E. K. Balls and Dr. W. B. Gourlay in northern Greece, Thessaly, Epirus, and South Macedonia. As this is the only complete set it is particularly valuable and is being worked out in detail. It is hoped

to publish a full account of it at a later date. Other presentations include :—Crete (Mr. P. H. Davis) ; Greece (Miss D. Lowe) ; Albania (Mrs. R. V. Pennington and Dr. P. L. Giuseppi) ; N. Macedonia (a particularly fine and valuable collection made by the Rev. and Mrs. H. P. Thompson) ; Corfu, Yugoslavia, etc. (Capt. A. H. Batten Poole, received through Dr. H. Bancroft) ; and Serbia (Miss K. M. Sitens).

A collection from Crete and Greece was purchased from Dr. F. Lemperg, a set of 500 specimens from the Dobruja from Mr. Al. Cretzoiu, and a well-prepared collection from Macedonia, Thessaly, etc., from Mr. O. Grebenchikoff. A set of over 900 specimens of Aegean plants was purchased from Dr. K. Rechinger. This makes a most welcome addition to the representation at Kew of plants from the Aegean Islands, which are still very little known botanically. It may be hoped that Dr. Rechinger's valuable results will stimulate other collectors to visit the Aegean area.

Specimens from Norway were presented by Mrs. Seys and by the Oslo University Botanical Museum. A valuable set of 114 Scandinavian *Carices* was received from Dr. C. G. Alm and a set of 54 numbers of *Celsia* spp. was presented by the Lund Botanical Museum. Material from Spitzbergen was received from Mr. A. M. Acock and from Mr. C. G. Dobbs.

Other European collections presented were : Austria (Mr. C. E. C. Fischer, Mr. E. Hodgkin, and Mr. J. W. Wyatt) ; Germany (Mr. D. B. Fanshawe and Mr. J. W. Wyatt) ; France and Switzerland (Dr. R. W. Butcher and Mrs. C. Q. Knowles) ; Czechoslovakia (Karlovy University, Prague, Cent. 4, Flora Cechoslovenica Exsiccata, and Masaryk University, Brno, Cent. 12, Flora exsiccata Reipublicae Bohemicae Slovenicae) ; and Poland (Cracow University, Series 2, Cent. 3, Plantae Poloniae exsiccatae).

From southern Europe specimens were presented by Miss B. Schafer (Spain and Portugal), Mr. P. Aellen (Corsica), and Mr. W. T. Stearn (Italy).

Oriental plants were received from Cyprus (Miss C. E. Godman, Lady Loch, Mrs. F. N. Stagg, and the Department of Agriculture, Nicosia) ; Iran (Miss M. Daly, Miss N. Lindsay, and Mr. A. C. Trott) ; Caucasus (Dr. Tad. Wisniewski) ; and Arabia (Mr. R. C. Maxwell Darling and Mrs. H. R. P. Dickson). Particular attention should be called to the very useful material being received from Cyprus, especially that collected by Mr. A. Syngrassides of the Department of Agriculture. It is hoped to make at Kew as complete a representation as possible of the interesting flora of this island, and further collections would be welcomed. Special mention should also be made of the welcome gift of Caucasian specimens from Dr. Tad. Wisniewski. The rich flora of the Caucasus is very imperfectly represented in western European herbaria, and many gaps remain to be filled.

Sets of plants from Palestine and Transjordania were purchased from Vester and Co., and sets 7, 8 and 9 of seeds of agricultural and weed plants, with corresponding herbarium specimens, were purchased from the Hamburgisches Staatsinstitut für angewandte Botanik.

From North Africa Prof. R. Maire presented specimens from Algeria and Mr. A. W. Trethewy valuable collections from Morocco. Dr. M. Grabham sent a small collection from Madeira.

Prof. P. E. Newberry presented a fine set of wild olives accompanied by a series of photographs of plants in their natural habitats.

Miss D. A. Chaytor (now Mrs. Manley) completed her work on the wild lavenders and, in the early part of the year, kindly assisted in naming several collections.

Miss W. M. Curtis continued her research on the anatomy and development of British and other *Taraxaca*, utilizing the material being grown in the Herbarium Experimental Ground.

Mr. R. A. Blakelock began work as a Sub-assistant in June, 1937, performing duties previously undertaken by the late Mr. A. R. Horwood.

Publications.—Additions to the Flora of Cyprus: III (K.B. 1937, 341).

A Taxonomic Study of the genus Lavandula (Journ. Linn. Soc. Bot. **51,** 153: 1937).

Verbascum pannosum Vis. (Gard. Chron. **101,** 135: 1937).

On the Flora of the Nearer East: XVIII (K.B. 1937, 79).

A Contribution to the Botany of Athos Peninsula (K.B. 1937, 197).

The Black Knapweed and its use in phenology (Quart. Journ. R. Meteor. Soc. **63**, 79: 1937).

Plants used in the Balkan Peninsula in place of Tea (Proc. Linn. Soc. 149th Session, 67: 1937).

A New Species of Sempervivum (Gard. Chron. **102,** 302, fig. 132: 1937).

Fritillaries (Roy. Hort. Soc. Lily Year-Book, **6,** 30; 1937).

The Genus Fritillaria in the Balkan Peninsula and Asia Minor (Journ. Roy. Hort. Soc. **62,** 329: 1937).

Asia.

Some 6000 new sheets were incorporated in the Herbarium, but there is still a considerable accumulation of arrears, mainly from the Malay Archipelago, remaining to be dealt with.

Indo-Malaya.—Professor E. Barnes sent a further 100 specimens of flowering plants and 120 cryptogams from South India. Several species proved to be new. His collections are particularly useful owing to their excellent condition, the full notes and the fact that some are accompanied by material preserved in formalin.

Mr. B. J. Gould, I.C.S., presented a large collection of plants from Tibet made by Mr. F. Spencer Chapman during their official

mission to Lhasa. The examination of the specimens has not progressed far, but one new species of *Androsace* has already been described for publication and figuring in the " Icones Plantarum."

The naming of the large collection presented by Dr. N. L. Bor, I.F.S., mainly obtained in the Naga Hills of Assam, has been completed with the exception of some 20–30 specimens which are being further investigated, as they appear to be new. Among those identified were a number which represent new records for India or at least for the Province of Assam.

The Natural History Museum of Paris presented over 200 Indo-Chinese specimens and the Burma Forest Department nearly 250 specimens. As a large percentage of the latter were found in the little-known Wa States in south-east Burma they are of special interest.

Smaller contributions came from the Arnold Arboretum (Siamese); the Assam Forest Department; the Agricultural Department, Ceylon; the Chandra Nurseries (Tibetan); the Forest Botanist, Dehra Dun; and the Royal Botanic Gardens, Calcutta.

Further consignments (totalling roughly 600 numbers) were received from the Forest Department, British North Borneo. The determination of the material received to the end of 1935 has now been suspended in order to deal with the Oxford University's Sarawak (1932) collection. Work on this was commenced in the summer, and the unexpectedly high proportion of novelties to be described from families not already dealt with by specialists, while enhancing the value of the collection, has retarded progress. The scientific importance of this collection will, it is felt, justify the publication of a complete enumeration of the phanerogams: this is now in course of preparation at Kew.

Nearly 500 duplicates of Malayan plants were presented by the Botanical Gardens, Buitenzorg, and about 300 by the Botanic Gardens, Singapore.

Dr. K. P. Biswas, Curator of the Herbarium of the Royal Botanic Gardens Calcutta, was deputed on a year's study leave, most of which was spent at the Kew Herbarium. Advantage was taken of his presence to discuss questions of common interest to the Kew and Calcutta institutions, especially with regard to certain authenticated specimens desired for the Calcutta Herbarium; as a consequence a selection of duplicates was extracted from the Herbarium and sent to India.

Miss M. M. Whiting has again volunteered her services and accomplished very useful work in sorting and rearranging the Indo-Malayan collections. Mr. H. B. G. Garrett, late of the Siam Forest Service, worked voluntarily on similar lines, and carried out very valuable service in laying-in many hundreds of sheets.

China.—Work on the taxonomy of Chinese lilies was continued, special attention being paid to the species from Yunnan and

Szechuan, for which the whole of Franchet's types were received on loan from Paris. Amongst the results obtained, the identity of the much misunderstood *L. nepalense* was established, and the morphological range and geographical distribution of *L. ochraceum* was revised and extended. A full record of this work was published in Part 5 of the Supplement to Elwes's Monograph of the genus Lilium.

Of collections received during the year the largest was a gift from the Nanking University of 1037 specimens, and another from the Lingnan University, Canton, of 963 specimens. Other contributions included *Orchidaceae* and *Liliaceae* from the Arnold Arboretum and the Sun Yatsen University, and *Carices* from the Imperial Universities of Hokkaido and Kyoto. Numerous sheets, both of types and unnamed material, were sent on loan to specialists, notably to Dr. Handel-Mazzetti, and the latter were returned greatly increased in value by the addition of critical determinations. Messrs. T. Tang and F. T. Wang of Peiping University continued their researches throughout the year on the *Liliaceae* and *Orchidaceae* of China, and were ever ready to assist the staff through their knowledge of Chinese script or geography.

Publications.—Contributions to the Flora of Siam : Additamenta XLI to XLIV (K.B. 1937, 26, 71, 87 and 371).

Pterocarpus Draco L. (K.B. 1937, 63 and 477).

The Gentians of China (K.B. 1937, 134).

New plants from Tibet and Sikkim (K.B. 1937, 94).

Contributions to the Gentian Flora of Southern Tibet, N.E. Burma and Bhutan (K.B. 1937, 180).

Notes on Lilium ochraceum Franchet and L. nepalense D. Don (K.B. 1937, 191).

The Genus Neurocalyx in Borneo (K.B. 1937, 281).

Imperfectly known Species Misplaced in the Flora of the Malay Peninsula, by C. F. Symington (K.B. 1937, 318).

Notes on Carex : I (K.B. 1937, 353).

Contributions to the Flora of Burma : XIII (K.B. 1937, 436).

Types of Chinese Lilies (R.H.S. Lily Year-book 1937, 96).

The first part (with plates) of "An account of the genus *Dioscorea* in the East," by Sir D. Prain and I. H. Burkill, much of the work on which was carried out at Kew by Mr. Burkill, was published towards the end of the year in the Annals of the Royal Botanic Gardens, Calcutta.

Africa.

During the latter part of the year Mr. E. Milne-Redhead, the Botanist in charge of the African department, was absent on special leave in Northern Rhodesia, where he is making an intensive botanical collection. The staff of the department was brought up to normal strength in June by the appointment of Dr. E. G. S. Brown to the post of Temporary Botanist in succession to the late Mr. A. R. Horwood (K.B. 1937, 121 and 356).

In addition to the very heavy routine work of naming collections, a considerable amount of time was occupied in replying to enquiries by research workers regarding the classification and nomenclature of African plants. Revisions of the genus *Cordyla* (*Leguminosae*) and of various *Stapelieae* were undertaken. Papers contributed by botanists not on the African staff included a further contribution to our knowledge of the arborescent Senecios of the East African mountains, an investigation into the morphological characters of the genus *Rhynchocalyx* with a view to establishing its taxonomic position, and studies on the genus *Brownanthus* (*Mesembryanthemeae*). An account of Mr. J. B. Gillett's Somaliland collection is being prepared for publication to accompany his paper on the vegetation of the region.

West Tropical Africa.—A collection of 123 specimens from the Gambia, made by Mr. L. H. Saunders, forms a useful contribution to our knowledge of this relatively little known area. Further collections have been made in Sierra Leone by Mr. F. C. Deighton, and a set of these has been received from the Department of Agriculture. The Gold Coast Forestry and Agricultural Departments have presented specimens collected by various officers. Nigerian specimens have been presented by the late Revd. Ivan D. Hepburn; the Imperial Forestry Institute, Oxford; and by Mr. R. J. Newberry.

Cameroons and Congo.—About 750 named duplicates, including many species previously unrepresented at Kew, have been received in exchange from the Botanic Gardens, Brussels, and a smaller number from the Natural History Museum, Paris. A number of specimens were also received from Mr. D. R. Rosevear.

North-East Tropical Africa.—Our collections from Eritrea and Italian Somaliland have been enriched by the receipt, as an exchange, of 245 specimens from the Istituto Botanico della R. Università, Bologna. An interesting set of about 50 numbers of Sudan plants was received from Mr. J. G. Myers, and other specimens from this area were contributed by Messrs. H. B. Johnston and E. Evans Pritchard. A small collection of poisonous plants of British Somaliland was presented by Mr. E. F. Peck of the Veterinary Service.

East Tropical Africa.—Interesting collections still continue to come in from this area, materially increasing our knowledge of the flora.

Uganda.—The technical excellence of the specimens received from the Departments of Agriculture and Forestry, maintains the previous high standard. Over 750 numbers were received from the former Department and about 250 from the latter.

Kenya.—Nearly 200 specimens were presented by the Forestry Department, and smaller numbers were received from the Veterinary Research Laboratory and the Department of Agriculture. Among gifts from private collectors were 91 specimens from Mrs.

D. R. Tweedie, and smaller numbers were received from Mr. A. W. Haylett, Mrs. Chater Jack, Lady Muriel Jex Blake, and Miss D. C. Mainwaring.

Tanganyika.—Kew is again indebted to the East African Agricultural Research Station, Amani, for fine collections from this area amounting to nearly 1500 specimens, besides a small number from Kenya. Over 900 numbers were received from the Department of Tsetse Research, collected by Mr. B. D. Burtt. These included a large number from Nyasaland and N. Rhodesia. Special thanks are due to Mr. Burtt for an extremely fine set of *Brachystegia*, including about 150 different gatherings, which will prove invaluable in the study of that difficult genus.

South Tropical Africa.—Nearly 300 numbers were presented by the Nyasaland Department of Agriculture, and 87 numbers by the Department of Agriculture, N. Rhodesia, collected by Mr. C. G. Trapnell. The last gatherings of the late Mr. F. Eyles in S. Rhodesia, numbering about 200, and including much material preserved in liquid, were the finest ever received from that able and prolific collector. Sr. A. de F. Gomes e Sousa has contributed a further 200 interesting specimens from Portuguese East Africa. Duplicates of Southern Rhodesian plants were also received from the Transvaal Museum.

South Africa.—During the course of the year about 1000 specimens from South Africa were named and 1010 specimens were incorporated in the Herbarium.

The Bolus Herbarium, Dr. H. G. Fourcade and Captain T. M. Salter presented fine named collections of Cape plants. Mr. F. R. Long of Port Elizabeth and Dr. J. S. Henkel of Maritzburg, Natal, forwarded a few specimens for naming. The Transvaal Museum, Pretoria, sent in 55 specimens for identification, of which 15 numbers were received as a donation. The Natal Herbarium, Durban, forwarded 311 numbers of Natal plants for naming and retention by the Kew Herbarium. Several smaller collections of plants (about 200 specimens), were sent in for naming, partly for retention, partly for return, by the McGregor Museum, Kimberley. As usual, the National Herbarium, Pretoria, contributed a large number of specimens, over 1350 in all, partly named, partly for critical determination, including 100 sheets of species of S. African *Aloë*. The bulk of these specimens was retained by the Herbarium. A small but interesting collection from the Barberton area was received for naming from the Empire Cotton Growing Corporation.

The Stellenbosch University, the McGregor Museum, the Bolus Herbarium and the National Herbarium most generously assisted the researches on *Ammocharis* undertaken by officers of the African section, by forwarding photographs and illustrations, dried, spirit and living material of the genus.

The drawings and photographs of *Mesembryanthemeae* in the collection of the late Dr. N. E. Brown have been incorporated in the general collection of drawings.

Mr. A. A. Bullock is continuing his researches on the *Mesembryanthemeae*, especially the genera *Trichodiadema* Schwantes and *Glottiphyllum* Haw.

Mr. B. L. Burtt and the Director in collaboration have almost completed their investigations of the genus *Scabiosa* in tropical and southern Africa.

Miss H. Forbes of the Natal Herbarium has returned to South Africa after having spent a period of 18 months in the study of the South African material of the genus *Tephrosia* Pers. in all the more important European herbaria.

Mr. E. Milne-Redhead and Dr. H. G. Schweickerdt have completed their researches on the genus *Ammocharis* Herb. and the manuscript is being prepared for the press.

Dr. Schweickerdt is continuing his studies on South African *Gramineae* (see p. 562), and during the course of the year several of his papers, among those mentioned below, were published.

Mascarene Islands.—About 50 specimens were received from the Department of Agriculture, Seychelles.

Publications.—Tropical African Plants: XV–XVII (K.B. 1937, 54, 333 and 411).

Note on a species of Neorautanenia, by E. P. Phillips (K.B. 1937, 86).

The Arborescent Senecios of the Cherangani Range (K.B. 1937, 361).

The Taxonomic position of Rhynchocalyx (K.B. 1937, 392).

The Genus Octolobus Welw. (K.B. 1937, 394).

Notes on the Flora of Southern Africa, VII, by I. C. Verdoorn and H. G. Schweickerdt (K.B. 1937, 445).

New trees and shrubs from Tropical Africa: V, by H. Dunkley (K.B. 1937, 466).

Notes on Carex: II (K.B. 1937, 472).

Notes on Mesembryanthemeae: I, The Genus Brownanthus Schwantes (K.B. 1937, 492).

A New Species of Streptocarpus (K.B. 1937, 514).

The Genus Cordyla Loureiro (Fedde, Repert. **41**, 227: 1937).

A New Synonym (Cactus Journal, Dec. 1937, 31).

Newly Recorded Genera of S. African Flowering Plants (S. Afr. Journ. Science, 1936, 438).

An Account of the S.A. Species of Tribulus Tourn. ex Linn. (Bothalia, **3**, pt. 2: 1937).

A Note on the S.A. Species of Ximenia Linn. (Bothalia, l.c.).

A Revision of the S.A. Species of Helictotrichon Bess. ex Schult. (Bothalia, l.c.).

A Revision of the S.A. Species of Brachylaena, R. Br., by E. P. Phillips and H. G. Schweickerdt (Bothalia, l.c.).

An Enumeration of Plants collected in the Northern Transvaal, by A. A. Obermeijer, H. G. Schweickerdt and I. C. Verdoorn (Bothalia, l.c.).

AMERICA.

During the year 10,105 sheets have been mounted, and about 6550 incorporated. For four months, from July to November, during the absence of the Botanist in charge of the American section of the Herbarium (Mr. N. Y. Sandwith) on a collecting expedition, the work was carried on single-handed by Mr. A. A. Bullock, who was at the same time responsible for the identification of South African succulents. For this reason there has been considerable delay in dealing with new collections, particularly with those of Mr. G. B. Hinton, who continues to send remarkably fine collections of Mexican specimens. His total numbers now exceed 10,500, and he sent 150 additional gatherings of *Bursera* which required special attention.

Items of work completed during the year included the account of the *Bignoniaceae* for Pulle's "Flora of Suriname," and the identification of a very large collection of *Strychnos* made in Amazonia by Mr. B. A. Krukoff. Among collections which were named were those of Mr. C. W. Thornton from Alaska, Mrs. A. L. Blake from Patagonia, and a small consignment from the Forest Department of British Guiana; while the whole of the Steinbach collection from Bolivia, purchased during the years 1927–1929, was finally incorporated.

The following collections were also received:—

N. AMERICA.—*Presented*: By the University of California, Berkeley (Alaska and California); California Academy of Sciences, San Francisco (California); Bentham-Moxon Trustees (Yukon, Alaska and Columbia); Mr. C. C. Cholmondeley (Labrador); Botanical Museum, Copenhagen (Greenland); Farlow Herbarium, Cambridge, Mass. (Cent. 8, Reliquiae Farlowianae); Gray Herbarium (Cent. 7 Plantae Exsiccatae Grayanae, and plants from Virginia); Mr. J. C. Greene (Canada and U.S.A.); Mr. F. J. Herman (Michigan and Indiana); Dr. H. H. Hume (*Cyperaceae* of Florida); Imperial Forestry Institute, Oxford (N. America); Mr. T. R. G. Moir (Newfoundland); Dr. and Mrs. H. N. Moldenke (American *Cyperaceae*); New York Botanical Garden (Florida); Mr. H. D. Ripley (critical S. Californian plants); Lord Rossmore (Greenland); Mr. C. W. Thornton (Alaska). *Purchased*: From Dr. Aven Nelson (Arizona).

CENTRAL AMERICA.—*Presented*: By Prof. C. Conzatti (Mexico); Mr. W. H. Fellowes (Mexico). *Purchased*: From Mr. F. Lyle Wynd (Mexico); Mr. Howard Scott Gentry (the Rio Mayo District of Mexico); Prof. T. G. Yuncker (British Honduras); Dr. A. F. Skutch (Costa Rica).

West Indies.—*Presented*: By Lord Moyne (Eastern Swan Island). *Purchased*: From Rijks Museum, Stockholm (Haiti and San Domingo, coll. Dr. E. L. Ekman).

East Tropical S. America.—*Presented*: By Department of Agriculture, British Guiana (Brazil, coll. Glaziou and others); Botanical Museum, Utrecht (Surinam), and Mr. C. H. Lankester (Matto Grosso). *Purchased*: From University of California, Berkeley (Brazil and Peru, coll. Mrs. Ynes Mexia); Mr. B. A. Krukoff (Brazil).

West Tropical S. America.—*Presented*: By Dr. J. Soukup (Peru); Miss Dora B. Stafford (Peru); United States National Museum, Washington (Panama Zone). *Purchased*: From Mr. R. J. Seibert (Panama Zone); United States National Museum, Washington (Peru, Coll. G. Klug); Mr. T. O. Weigel (Buchtien, Herbarium Bolivianum Cent. 9 & 10, part).

Temperate S. America.—*Presented*: By Dr. Manuel Barros (Argentine *Carices*); Mrs. M. E. Blake (Argentine); Mr. T. Meyer (Chaco region); Museo Nacional de la Plata (*Carices* and *Compositae* of Chile).

Publications:—Contributions to the Flora of Tropical America XXIX–XXXIII;

The Genus Periptera (K.B. 1937, 75);

New species and records from British Guiana (K.B. 1937, 100);

Plantae Hintonianae: III–V (K.B. 1937, 291, 447 and 502).

On the Identification of Rhus filicina Sessé et Moc. ex DC. (K.B. 1937, 440).

Notes on Tropical American Bignoniaceae (Rec. Trav. Bot. Néerl. **34**, 205: 1937).

Identification of certain Candollean types of South American Bignoniaceae (Candollea, **7**, 244: 1937).

Australia and New Guinea.

Good progress was made in getting the large amount of outstanding material mounted and incorporated into the Herbarium, and the greater part of the Australian material has now been dealt with. There still remains, however, a considerable accumulation of New Guinea specimens. Mr. C. E. Hubbard's Queensland plants (excluding *Gramineae*) have now all been named and incorporated with the exception of the *Cyperaceae*, and a large number of duplicates are ready for distribution. Dr. F. A. Rodway continued to send interesting collections, mainly from southern New South Wales, containing many rare or little-known species. Other collections were received from Mr. J. M. Black (Adelaide); Mr. E. Ashby (mostly Western Australia); Mr. A. V. Giblin (Tasmania); the National Herbarium, Sydney; and the North Queensland Naturalists' Club. Capt. J. McComish sent an interesting series of

plants from Lord Howe Island containing good additional material of many of the rare endemic species.

From March onwards Mr. C. A. Gardner, Government Botanist of Western Australia, has been working in the Herbarium and has been engaged on his projected "Flora of Western Australia." As a result many of the genera in the Herbarium have been thoroughly revised and the determinations have been brought up to date. Mr. Gardner has presented (on behalf of his Department) over 1100 duplicates of his own and other collections, including more than 300 grasses. These contain material of many of his newly described species and numerous other rare or local plants and constitute a very valuable addition to our Western Australian collections.

Dr. R. T. Patton of Melbourne University has also spent a great deal of time in the Herbarium studying the genus *Eucalyptus*, particularly the Eastern Australian species. His notes on many of the sheets will greatly enhance the value of the Kew collection of this most difficult genus. He has also kindly helped in the determination of critical material of *Eucalyptus* sent in for naming.

In the earlier part of the year Mr. J. Bausch of Rotterdam carried out a revision of the remarkable family *Eucryphiaceae*, of which several species are Australian.

Little active work has been done on New Guinea plants, but Miss B. Blackwood has sent over 300 specimens from the Territory of New Guinea, both from the mainland and the island of New Britain, while small collections have been presented by the New York Botanical Garden and the Department of Agriculture, New Guinea.

New Zealand.

Little work was carried out on the flora of New Zealand apart from replying to enquiries and determining specimens received for identification. Further consignments of interesting plants were received from Dr. H. H. Allan.

Oceania.

A number of minor questions were dealt with during the year. The Bernice P. Bishop Museum, Honolulu, presented a large collection of duplicates from various parts of Oceania, and a small set of Samoan plants was purchased from Dr. K. Rechinger. Work was continued on the genus *Ficus*, material being received from Dr. A. Guillaumin, Paris (New Hebrides), the Botanic Gardens, Brisbane (Solomon Islands) and other sources. The study of the Samoan species is now practically completed and an account of the Fijian species is being prepared. A good deal of critical comparative work has also been carried out on species from other island groups and from the neighbouring region of New Guinea. There is a considerable accumulation of specimens from this area, in the Store,

awaiting mounting, but it is hoped that the bulk of these will be dealt with during 1938.

Publications :—*Ficus* in A. C. Smith's "Fijian Plant Studies" (B. P. Bishop Museum, Bull. 141, 49).

Orchidaceae.

Collections from all over the world, numbering well over 1000 gatherings, were named in the course of routine work. These included many living plants from the Gardens, in connexion with the preparation of the new edition of the Orchid Handlist.

Research has been continued on the orchids of Africa and of Burma and Siam. The genera *Rhipidoglossum* and *Ansellia* have been revised, while work towards a general monograph of *Habenaria* has been much aided by the loan of nearly 150 specimens from the Stockholm Herbarium. Mr. G. Le Testu of Caen, France, sent on loan a large collection of African orchids (mostly from the Gabon and Wrangi-Shari), for determination. He has also presented duplicates of many numbers. This very fine collection contains many remarkable and hitherto unknown or little-known species. Since the publication of the "Flora of West Tropical Africa" very good material in spirit of many of the Gold Coast species has been received from Messrs. J. K. Cox and G. S. Cansdale. Mr. Cox also brought over a large selection of living plants in excellent condition, many of which have flowered and, so far as is known, are the first records of these species in cultivation. Several new records for West Africa have already been made. A small but valuable collection of Cyprus orchids (mostly with corresponding spirit material) was received from Mr. A. Syngrassides, several of which belonged to rare and little-known species of *Ophrys*. Further similar material would be welcomed from this region, especially of the genus *Ophrys* which contains many critical Eastern Mediterranean forms. Messrs. T. Tang and F. T. Wang concluded the main part of their work at Kew on the orchids of China and Japan. As a result the determination of much of the material of adjacent countries has been brought into line with the most recent research.

Publications.—African Orchids : IX (K.B. 1937, 457).

A Review of the Genus Rhipidoglossum (Blumea, Suppl. I, 78).

Orchidaceae in Norlindh and Weimarck, Beiträge zur Kenntnis der Flora von Sud-Rhodesia : V (Bot. Notiser, 1937, 182).

Gramineae.

In addition to the usual routine work of rearranging genera, naming and laying-in specimens, reports on economic grasses for a variety of purposes have been prepared, whilst the nomenclature for several British, New South Wales and Indian lists of grasses has been checked. Owing to the absence of a special preparer for grasses, only a comparatively small number (650) has been mounted and added to the Herbarium. The number of specimens named

(3010) excludes British, common European grasses and small collections of less than ten gatherings. In order to determine this large quantity of material, it has been necessary to curtail the amount of time spent on research and especially that required for the preparation of the next part of the " Flora of Tropical Africa." A number of large and important collections received during the past few years still await determination. In connexion with the exchange of duplicates, over 1950 sheets have been distributed to 16 different herbaria.

Dr. H. G. Schweickerdt has continued his studies of South African grasses. His revision of the South African species of *Helictotrichon* was published in Bothalia, **3,** pt. 2 (1937), whilst notes and descriptions of other grasses will appear shortly in Fedde's Repertorium. He hopes to complete his account of the species of *Aristida* in South Africa after an examination of specimens in the principal European herbaria and a study of certain species in the field. Mr. C. A. Gardner has collaborated in describing new genera and species of grasses from Western Australia.

Amongst visitors, Miss J. Vickery of the National Herbarium, Sydney, commenced work towards the end of the year and intends to spend several months studying Australian grasses, in particular those from New South Wales. Mr. J. N. Whittet of the New South Wales Department of Agriculture spent a few days investigating grasses suitable for cultivation in eastern Australia. Mr. J. E. Senaratna, Assistant in Systematic Botany at Peradeniya, who is engaged in a revision and comprehensive study of the genera *Leptaspis* and *Pharus*, expects to spend 2 years in England and to work largely at Kew. In connexion with his studies, a valuable series of specimens of *Leptaspis cochleata* (living, spirit, and dried) has been received from Mr. Eggeling and Mr. Chandler of Uganda and from the East African Research Institute, Amani, Tanganyika Territory.

The collections received during the past year contained many valuable additions to the Herbarium. As in the last ten years, those from tropical Africa have been most numerous. They have included specimens of many species which were not represented when the first four parts of the " Flora of Tropical Africa " were published. Most general collections contain a certain number of grasses, but a considerable number entirely or mainly composed of these plants have also been received. The more important are listed below.

America :—United States Department of Agriculture (Newfoundland, United States, Brazil, Surinam, including several co-types, and a valuable set of species of *Mesosetum*) ; Professor P. Weatherwax (United States, Guatemala) ; Miss T. C. W. Greene (Canada) ; Dr. D. Hooper (St. Vincent) ; Universidad Nacional de la Plata (Argentine) ; Professor L. R. Parodi (Argentine, including co-types of new species) ; Welsh Plant Breeding Station,

Aberystwyth (Falkland Islands). *Africa* :—Departments of Agriculture, Uganda, Kenya, Nyasaland, Northern Rhodesia, Sierra Leone and Gambia ; Mr. H. B. Johnston (Uganda, Sudan, Belgian Congo) ; East African Agricultural Research Station, Amani (Tanganyika) ; National Herbarium, Pretoria (South Africa) ; McGregor Museum, Kimberley (South Africa) ; Dr. R. E. Vaughan (Mauritius). *Asia* :—United States Department of Agriculture (Sumatra, China) ; Dr. N. L. Bor (Assam) ; Economic Botanist, Bengal (specimens of *Oryza sativa* var. *plena*). *Australasia* :—University of Melbourne (Central Australia, Victoria) ; Professor J. B. Cleland (South and Central Australia) ; Mr. R. A. Black (Victoria and New South Wales) ; National Herbarium, Sydney (New South Wales) ; Department of Agriculture, Perth (Western Australia) ; Mr. S. T. Blake (Queensland, including an extensive series of specimens of *Eragrostis* spp.). *Europe* :—Academy of Sciences, Leningrad (Russia, including recently described species) ; a valuable collection of intergeneric and interspecific hybrid grasses and their parents, raised and presented by Dr. T. J. Jenkin, Welsh Plant Breeding Station, Aberystwyth.

Publications.—Flora of Tropical Africa, vol. 10, part I.
Notes on African Grasses : XXI (K.B. 1937, 63).
The Races of Sorghum, by I. H. Burkill (K.B. 1937, 112).
Sand-binding Grasses in the Falkland Islands (K.B. 1937, 274).
Hooker's Icones Plantarum (tt. 3331, 3336–38, 3341).

Pteridophyta.

The preparation of the new edition of the " Handlist of Ferns in cultivation at Kew " has been continued throughout the year, and it is hoped that it will be possible to publish it in 1938. In this connexion valuable help has been afforded by Dr. Carl Christensen of Copenhagen who was able to assist in the naming of a large number of unnamed and unlocalised material from the Ferneries. Few collections were received during the year. About 50 Japanese specimens were presented by Dr. Tagawa, and nearly 100 specimens from Honduras collected by Messrs. Yuncker, Dawson and Youse. The latter were purchased and formed part of a general collection from the area.

Dr. K. Biswas (p. 553) completed an account of the fern flora of Burma which he had begun at the Calcutta Herbarium.

During the year 800 sheets were incorporated, while large numbers still remain sorted into genera and arranged in special cabinets.

Publications.—Notes on Ferns and Fern Allies : I (K.B. 1937, 346).

Bryophyta and Charophyta.

In addition to material received from the British Isles, collections of Mosses have been received for identification from Southern India, collected by Professor E. Barnes, and from Tristan

da Cunha, collected by Dr. R. A. Dyer during an expedition sent out from Pretoria. Specimens of *Chara* and *Nitella* from various parts of the world have been named, and, as in former years, Mr. G. O. Allen has very kindly co-operated in the work of identification. He has, moreover, presented to the Herbarium 55 microscopic slides of specimens of this group, which form a valuable addition to the slide collection.

Thallophyta.

Fungi.—Accessions to the mycological collections in 1937 included an interesting collection of 61 specimens illustrating Dr. Hedgcock's paper on blue-staining wood fungi. These were presented by the United States Department of Agriculture. Dr. L. Haumann sent specimens illustrating his work on *Penicilliopsis*, and Dr. Boedijn presented named Javan fungi, chiefly *Basidiomycetes*. 200 specimens in continuation of Sydow's Mycotheca Germanica were purchased during the year, and 100 Reliquiae Farlowianae were received in continuation of exchange.

Among the larger collections sent for determination were the whole of the unnamed *Polyporaceae* from the Dehra Dun herbarium (received through the Imperial Mycological Institute), a large collection of American *Thelephoraceae* made by Mr. W. Bridge Cooke, and Uganda microfungi from Mr. C. G. Hansford. The Kew Herbarium now possesses a fine collection of *Meliolineae* made by Mr. Hansford in Uganda, including most of the types described by him in a recent paper.

During September, October and November practically the whole working day was devoted to the naming of British Agarics, the sendings of which, by many correspondents, were abnormally heavy.

Miscellaneous enquiries received during the year ranged from advice on plant diseases, dry rot, etc., to information as to certain fermentation processes and recommendations as to mycological books. An unusual case of fungus poisoning, due to *Inocybe Patouillardii*, was recorded, causing one death and the serious illness of three other persons. Though it is very unlike *Psalliota* in appearance the fungus was apparently eaten in error for the common mushroom. The species was probably unusually common in the south of England during the past summer, for at the end of June it was received for identification from three different localities within a fortnight.

As usual, routine work has also included assistance given to research workers by the loan of specimens or of slides, and advice in problems of nomenclature.

Publications.—A stem-canker disease of Gardenias, by W. Buddin and E. M. Wakefield (Gard. Chron. **101,** 226–227, April 3rd, 1937).

Algae and Lichens.—Work on the marine algal flora of South Africa has been continued. A considerable number of queries relating to the identity of algae and lichens have come from research workers in the British Isles and elsewhere, and more than the usual number of requests for information as to the treatment of lawns and playing-fields infested with *Nostoc* have been received.

An interesting addition to the algal herbarium was a collection of 140 North American marine and fresh-water algae mainly collected by the late Dr. M. A. Howe, and presented by the New York Botanical Garden. Dr. W. R. Taylor spent several weeks in the Herbarium mainly in connexion with his study of the seaweeds of the Galapagos Islands.

A further 200 specimens, being fascicles 4–7 of Lichenes Fenniae Exsiccati, have been acquired as an exchange from the Botaniska Museum, Helsingfors. Smaller collections of lichens presented were received from Portuguese East Africa, Rhodesia, Uganda and South America. A number of lichens were again sent on loan to Dr. K. Redinger at Vienna.

Spirit Collection.

The most important event during the year has been the rearrangement of the collections, the separate spirit chamber containing now only orchids, the other families having been moved to 16 steel cabinets housed in the cellar under Wing B. Here there is ample room for expansion and the addition of new cabinets. 763 bottles were added during the year, a considerable increase over last year's accessions. This was partly due to accumulations connected with the rearrangement, but also reflects the increasing use made of this method of preservation. Material of many West African orchids has been received during the year, while Mr. N. Y. Sandwith brought back about 150 gatherings in spirit made during his visit to British Guiana and the West Indies. Interesting material of many species of *Utricularia* is included among this. Spirit specimens of African *Utricularieae* and of *Podostemaceae* were also received from Mr. A. S. Thomas, who collected them in the Imatong Mountains of southern Sudan.

Representatives of 17 more genera of *Orchidaceae* were added during the year, making a total of 275 genera now contained in the collection. The preparation of the Orchid Handlist will be considerably facilitated by the very complete collection of spirit material made from the plants in the Gardens during the last seven years. Material of succulent plants growing in the Gardens (mostly *Cactaceae*, *Mesembryanthemum* (sensu lato) and *Stapelieae*), was collected along the lines suggested in the last report.

Experimental and Transplant Work.

Genetical research was continued at the Potterne Biological Station and at Kew on *Silene*, *Centaurea*, *Ranunculus*, and *Saxifraga*.

A considerable part of the experimental work with *Silene* involved foreign, and especially Alpine, material, selfing and intercrossing various stocks, and crossing the same plants with British and other material of *S. vulgaris* and *S. maritima*. In *Centaurea* the first batch of F_3 families was scored and crosses were made to reinvestigate the variation known as "*longiflora*." Mr. E. M. Marsden-Jones is continuing research at Potterne on *Anagallis* (with Prof. F. E. Weiss), on *Solanum Dulcamara*, and on *Epilobium*. Investigation of the apomicts and variations of *Taraxacum* was continued at Kew. A large number of species of plants of known wild origin from the Balkan Peninsula was studied at various stages of development from abundant living material. Especially valuable material of several important genera, including *Campanula*, *Dianthus*, and *Verbascum*, was obtained for the Herbarium.

The Transplant Experiments of the British Ecological Society at Potterne have completed the tenth year of their existence. The fourth (biennial) report has been published and the fifth prepared for press. A summary of the ten years' researches has also been prepared for publication.

Publications.—Fourth Report of the Transplant Experiments of the British Ecological Society at Potterne, Wiltshire (Journ. Ecol. **25,** 189 : 1937).

Researches on Silene maritima and S. vulgaris : XVII–XX (K.B. 1937, 45, 310, 432, 481).

Seed Collection.

The growth of this valuable and much used collection necessitated the provision of an additional cabinet. The four cabinets have been reconstructed and made into a convenient uniform set placed on the second floor of Wing A. The large accumulations of new specimens have been incorporated and the whole collection spaced out and the drawers re-labelled. The simplicity of arrangement and the ease with which the specimens may be consulted have proved of great assistance to visiting botanists who, together with members of the staff, have made considerable use of the collection.

Summary.

The routine work, apart from naming, accomplished during 1937 may be summarised as follows :—

Mounted	46,500 (approx.)*
Incorporated	41,800 (approx.)*
Duplicates distributed	12,440
Specimens received on loan	8414
Specimens sent on loan	8165
Specimens presented or purchased ...	44,066

* Not including lower cryptograms.

Fumigation of Specimens.

Since the fumigation of the Stores in 1936 (see K.B. Appendix 1936, 572) it was considered advisable to adopt a more efficient method of gas-poisoning specimens than by using carbon bisulphide. This method, which had been used for many years, had several serious drawbacks and was doubtfully efficacious. Accordingly, an apparatus was installed for subjecting the specimens to a high concentration of hydrogen cyanide gas, a more detailed description of which will be given in an early number of the Kew Bulletin.

The apparatus was ready for regular use in October, and several thousand specimens, both mounted and unmounted, were dealt with before the end of the year. It is now a rule that all specimens must pass through the fumigation chamber before being brought into the Herbarium.

Illustrations and Portraits.

Many additions to the collection of photographs and drawings have been received and laid in during the year, including the following :—

Over 500 photographs, drawings and tracings of *Mesembryanthemeae*, from the collection of the late Dr. N. E. Brown ; 50 plates of the " Flowering Plants of South Africa " from Dr. Pole Evans ; 44 water-colour drawings, 3 photographs and a pencil drawing prepared for the " Botanical Magazine " presented by the Royal Horticultural Society ; over 500 photographs of types, from the United States National Herbarium ; 115 photographs from Dr. A. L. Cabrera, Museo Nacional, La Plata, and 67 photographs from the National Herbarium, Pretoria. Mr. T. Green of Melbourne presented a fine collection of over 120 stereoscopic photographs of Victoria and New South Wales plants and bush scenery. A presentation of copies of Hooker's Icones Plantarum, together with a number of the original drawings, was made by the Bentham-Moxon Trustees. In addition, about 100 drawings, paintings and photographs were received from various sources, and have been incorporated in the collection.

A fine collection of portraits of eminent botanists, both English and foreign, which filled many gaps in our collection, was received from Prof. F. W. Oliver, and a further collection of portraits of British botanists was received from Mr. H. Stuart Thompson.

Index Kewensis.

Supplement 9 has been completed, the cards have been duplicated, and the originals have been sent to the Clarendon Press. The Supplement contains a greater number of entries than usual, there being nearly 40,000 cards. Already a large proportion of the proofs has been received, read, corrected and returned, and it is reasonable to hope that it will be published towards the middle of 1938. In order to comply more closely with the International

Rules of Botanical Nomenclature as amended at Cambridge and Amsterdam, some changes will be observed in the method of citation in the current Supplement ; for example, the comma between the specific epithet and the author's name has been omitted, and Article 49 has been followed rigidly as regards names of species, and as far as practicable in names of genera. Art. 49 : " When a genus or a group of lower rank is altered in rank but retains its name or epithet, the original author must be cited in parenthesis, followed by the name of the author who effected the alteration. The same holds when a subdivision of a genus, a species, or a group of lower rank, is transferred to another genus or species with or without alteration of rank." It is felt that this citation of authors' names for purposes of precision will be a great help to all botanists engaged in systematic work.

Another slight alteration in form is the substitution of the word " hybr." by the signs × or + before the generic name or specific epithet.

As in Supplements 7 and 8 a list of new generic names placed under their families in alphabetical order will be appended.

The work of compiling Supplement 10 has already started, although progress will be slow until after the publication of Supplement 9.

Nomenclature, Bibliography and History of Botany.

The work on this subject increases yearly, due mainly to the fact that authors of botanical papers and floras realise more and more the desirability of adopting the correct names according to the International Rules. Very frequently lists are submitted for examination and it may take a considerable time to investigate the status of certain names. Assistance of this kind has been given whenever possible ; special mention may be made of the forthcoming " Flora of Devon " now in the hands of the printers.

Work in connexion with the International Committees on Nomenclature has been continued, especially concerning the correct names of Economic Plants.

An undertaking of exceptional interest has been the revision of the late Sir Arthur Hort's translation of Linnaeus's " Critica Botanica." This work consists of a series of aphorisms concerning rules of nomenclature with discussions on each, and it gives a clear insight into Linnaeus's views on this subject. As the translation had not been finally completed by the author, a considerable amount of work has been necessary to prepare it for the press. The book is being published by the Ray Society and will appear shortly.

A great deal of nomenclatural investigation has been carried out in connexion with a new edition of the " Handlist of Gymnospermae " and an effort has been made to obtain the correct names under the International Rules, since it is felt that the publication

will be a great asset to foresters and owners of collections. Up to the present the nomenclature of the group has been somewhat unstable.

Publications.—Nomenclature : Pterocarpus Draco L. (K.B. 1937, 63 and 477).

The correct name of the Yellow Hybrid Aster (K.B. 1937, 350).

On the status of the name Bursera subsessiliformis Engl. (K.B. 1937, 352).

On the identification of Rhus filicina Sessé & Moc. ex DC. (K.B. 1937, 440).

Epipogum or Epipogium (K.B. 1937, 475).

Notes on the Genus Centaurium : I (K.B. 1937, 497).

Bibliography.—Citations marked with an asterisk in Linnaeus's Species Plantarum (Journ. Bot. 1937, 78).

New names published anonymously by Robert Sweet in "The News of Literature and Fashion" (1824–26) (Journ. Bot. 1937, 192).

The dates of publication of Bentham's Flora Australiensis (Journ. Soc. Bibl. Nat. Hist. **1**, pt. 3 : 1937).

The dates of publication of Ecklon & Zeyher's "Enumeratio" and E. Meyer's "Commentarii" (Journ. Soc. Bibl. Nat. Hist. **1**, pt. 4 : 1937).

History of Botany : The Herbal of Valerius Cordus (Proc. Linn. Soc. Lond. 1937, pt. 3, 156).

Early Herbals (Pharm. Journ. 1937, 139, 515).

Visitors.

The number of signatures in the Visitors' Book for the year 1937 was 5346.

The following kindly gave voluntary assistance in the Herbarium :—Mr. H. N. Ridley again helped in naming Malayan specimens, and Miss M. M. Whiting in arranging and classifying the Indo-Malayan material ; Mr. R. A. Blakelock (before his appointment to the staff in July), and Miss D. A. Chaytor gave assistance in the European section, and Mr. D. P. Fanshawe in naming European and other collections. Mr. P. H. Simon kindly worked on grasses and helped in rearranging the North American species of *Paspalum*.

Amongst frequent or regular visitors were members of the staffs of the Department of Botany, British Museum (Natural History), the Imperial Mycological Institute, and the Imperial Forestry Institute, Oxford. The Staff employed by the Royal Horticultural Society in connexion with the preparation of the "Index Londinensis" and "The Botanical Magazine" have worked in the Herbarium and Library throughout the year.

The most noteworthy or frequent visitors to the Herbarium were the following :—

Prof. R. S. Adamson (Cape Town) ; Revd. Leslie W. A. Ahrendt ; Mr. A. H. G. Alston ; Mr. F. C. Armstrong (Perak) ; Major G. Aylmer (Sudan).

Mr. E. G. Baker ; Mr. E. K. Balls ; Miss W. F. Barker (Kirstenbosch) ; Miss E. C. Barnett ; Mr. J. Bausch (Rotterdam) ; Mr. W. J. Bean ; Dr. G. R. Bisby ; Dr. K. Biswas (Calcutta) ; Mr. J. P. M. Brennan ; Professor A. H. R. Buller (Winnipeg) ; Mr. I. H. Burkill ; Mr. B. D. Burtt (Tanganyika).

Miss D. A. Chaytor ; Dr. A. Clark ; Dr. S. Clay ; Prof. R. H. Compton (Kirstenbosch) ; Mr. J. K. Cox (Gold Coast).

Dr. J. M. Dalziel ; Mr. J. E. Dandy ; Mr. A. G. Davis ; Mr. H. N. Dixon ; Mr. H. L. Dunkley.

Mr. A. W. Exell.

Mr. D. P. Fanshawe ; Dr. H. R. Fletcher ; Mr. F. Flippance (Penang) ; Miss Eva Francis ; Dr. Lilian Fraser (Sydney).

Mr. H. B. G. Garrett (late Forest Office, Siam) ; Dr. W. Balfour Gourlay ; Mr. A. Grove ; Dr. Otto von Gumppenberg (Berlin).

Mr. J. H. Holland ; Dr. D. Hooper ; Mr. A. C. Hoyle.

Miss J. B. Imlay.

Mr. A. Bruce Jackson.

Dr. A. F. G. Kerr ; Dr. A. Kostermans (Utrecht) ; Dr. & Mrs. Vladimir Krajina (Prague).

Mr. C. H. Lankester ; Mr. J. E. Lousley.

Mrs. Dorothea W. Mackay (Johannesburg) ; Mr. E. W. Mason ; Dr. H. E. McMinn (Oakland, California) ; Mr. S. K. Mukerji (Lucknow) ; Mr. B. O. Mulligan ; Mr. H. Muyser (Rotterdam).

Mr. C. Norman.

Lt.-Col. C. L. Meyler O'Malley.

Dr. Reuben T. Patton (Melbourne) ; Mr. T. Petch ; Dr. W. R. Philipson ; Dr. N. Polunin ; Mr. W. R. Price ; Mr. H. W. Pugsley.

Mr. H. N. Ridley ; Dr. Kurt Roos (Zurich).

Miss K. Sampson ; Mrs. C. I. Sandwith ; Mr. J. R. Sealy ; Mr. J. E. Senaratna (Peradeniya, Ceylon) ; Mr. P. H. Simon ; Mr. N. Douglas Simpson ; Miss L. Snelling ; Miss M. S. Sprague ; Mr. W. T. Stearn ; Major F. C. Stern ; Mr. A. L. Still ; Dr. H. K. Svenson (Brooklyn, Mass)

Mr. T. Tang (Peiping) ; Dr. G. Taylor ; Dr. W. R. Taylor (Ann Arbor, Mich.) ; Mr. A. W. Trethewy ; Mr. Robt. S. Trickett.

Miss J. W. Vickery (Sydney).

Mr. F. T. Wang (Peiping) ; Mr. E. F. Warburg ; Mr. C. A. Weatherby (Harvard) ; Mrs. M. L. Wedgwood ; Dr. Lewis E. Wehmeyer (Ann Arbor, Mich.) ; Miss M. M. Whiting ; Dr. Ira L. Wiggins (Stanford Univ., California) ; Mr. S. Baker Williams ; Miss Marian Wilson (Sydney) ; Mr. S. P. Wiltshire ; Dr. & Mrs. Tad. Wisniewski (Warsaw) ; Mr. W. C. Worsdell.

Distribution of Duplicates.

The following were the principal institutions to which duplicates were distributed :—

Great Britain.—London, British Museum (Natural History) ; Kew, Imperial Mycological Institute ; Oxford, Imperial Forestry Institute.

Europe and Orient.—Algiers, University Botanical Institute; Berlin, Botanic Gardens and Museum; Bologna, Botanical Institute of the University; Brno, Masaryk University; Brussels, Botanic Garden; Cluj, Botanical Museum; Florence, Botanical Institute of the University; Geneva, Museum and Botanic Garden; Helsingfors, Botanical Museum; Krakow, Academy of Sciences; Leiden, 's Rijks Herbarium; Leningrad, Botanical Museum of the Academy of Sciences; Lund, Botanical Museum; Lisbon, Colonial Garden; Paris, Natural History Museum; Stockholm, Natural History Museum; Utrecht, Botanical Museum and Herbarium; Zurich, University Botanical Museums and Gardens.

Asia.—Calcutta, Botanic Gardens; Buitenzorg, Botanic Gardens.

Africa.—Amani, East African Agricultural Research Station; Pretoria, National Herbarium.

America.—Brooklyn, Botanic Garden; Buenos Aires, Botanical Laboratory of the Faculty of Agriculture; Cambridge, Gray Herbarium and Farlow Herbarium; Gainesville, University of Florida; Ithaca, Bailey Hortorium; Jamaica Plain, Arnold Arboretum; Jamaica Plain, Oakes Ames Herbarium; New York, Botanical Garden; La Plata, Museo de La Plata; Washington D.C., United States National Museum.

Australia.—Brisbane, Botanic Museum and Herbarium; Melbourne, National Herbarium.

Oceania.—Honolulu, Bernice P. Bishop Museum.

The Library

The task of preparing for publication Supplement 2 of the Library Catalogue was begun in 1937. This has occupied the time of the Acting Librarian for a considerable portion of the year. It is hoped that the work will be finished during the early part of 1938.

The Assistant Librarian has continued to devote a part of most days to the cataloguing of the arrears mentioned in last year's report as having been taken in hand. Only a comparatively unimportant residue of this now remains uncatalogued, and it is probable that this will be cleared up in 1938. It should perhaps be mentioned that current cataloguing, which is of considerable extent, is dealt with week by week in addition to the arrears.

Arrears of binding have also been considerably reduced, owing to the renewal of a special grant for this purpose. As many as 569 books under this heading have been sent to the binders during 1937. One important class of "arrears" of binding is the large number of old botanical works and papers which were broken up from composite volumes many years ago and placed in the tracts. Many of these are of great importance to taxonomists, and should be bound up for their better protection, and made more readily available by being placed in the subject arrangement on the shelves.

The quarto tracts have been dealt with in this way during 1937, and the octavos will be taken in hand early in 1938.

The third member of the library staff, besides performing the routine work of entering books, etc., has prepared and despatched 556 current volumes to the binders. A start has also been made on the arrangement and preparation for binding of plant lists which have not been bound for some years and were becoming difficult to consult.

Two bibliographical papers dealing with the dates of publication of works containing new botanical names were published during 1937. These are included under the heading "Nomenclature and Bibliography," p. 569.

Presentations to the Library.

Mrs. M. L. Wedgwood has given to the Library 44 volumes from the library of the late C. E. Salmon. They are largely local British and Continental Floras, and have considerably enriched the Kew representation of these sections of botanical literature. Many of them have been rebound with the kind help of the donor.

Sir David Prain has presented to the Library the continuation of a number of periodicals, as in many former years.

A further volume of the *Flora URSS*, i.e. vol. 6, has been given to Kew by the Botanical Institute of the Academy of Sciences, Leningrad.

Kew is indebted to the New York Botanical Garden for *Addisonia*, *Brittonia*, and the *North American Flora*, in continuation, and for other publications.

The Trustees of the British Museum have presented the following :—*An index to the authors* (*other than Linnaeus*) *mentioned in the Catalogue of the Works of Linnaeus preserved in the Libraries of the British Museum*. Ed. 2, 1933.

The Crown Agents for the Colonies have presented, among other publications, four copies of Dr. J. M. Dalziel's *Useful Plants of West Tropical Africa*.

From the Geological Society have come a number of volumes of the Contributions of the United States National Herbarium and of Hayata's *Icones Plantarum Formosanarum*.

Two copies of the *Lily Year-Book* for 1937 (No. 6) have been presented by the Royal Horticultural Society.

The Bentham-Moxon Trustees have presented the following works to the Library during 1937 : P. J. D'Avoine and Charles Morren, *Éloge de Rembert Dodoëns . . . suivi de la concordance des espéces végétales décrites et figurées par Rembert Dodoëns*, etc., Malines & Bruxelles, 1850, a valuable addition to the Library in connexion with our set of Dodoëns' works ; E. Bonnet, *Les Thériaques de Nicandre d'apres les figures du manuscrit grec de la Bibliothèque Nationale de Paris* (Bull. Soc. Synd. Pharm. Côte-d'Or, no. 28), 1911, and the same author's *Documents pour servir à*

l'histoire de la collection de Miniatures d'Histoire Naturelle connue sous la denomination de Vélins du Museum (Comptes Rendus Assoc. Franç. Avanc. Sci., Congr. Montauban) Paris, 1903; A. White & B. L. Sloane, *The Stapelieae*, Pasadena, 1937, the second edition of this work in 3 volumes; W. Rytz, *Pflanzenaquarelle des Hans Weiditz aus dem Jahre 1529. Die originale zu den Holzschnitten im Brunfels'schen Kräuterbuch*, Bern, 1936, containing 15 reproductions of Weiditz's coloured drawings.

The Trustees have also enabled Kew to secure the continuation of various journals by placing at its disposal exchange copies of *Hooker's Icones Plantarum*.

The Editor of "Nature" has presented the following:—O. C. Ayres, *Soil erosion and its control*; J. Braun-Blanquet and E. Rübel, *Flora von Graubünden*; M. Buchli, *Oekologie der Ackerunkräuter der Nordostschweiz*; J. S. Gamble and C. E. C. Fischer, *Flora of the Presidency of Madras*, part XI; H. S. D. Garven, *Wild flowers of N. China and S. Manchuria*; C. L. Gatin, *Les fleurs des bois*; H. Gilbert-Carter, *British trees and shrubs*; A. F. Hill, *Economic botany: A textbook of useful plants and plant products*; H. G. Jameson, *Trees and flowers of England and Wales*; L. Jost, *Baum und Wald*; D. Kenmare, *The country's year and other nature writings*; L. C. C. Krieger, *The mushroom handbook*; J. Motte, (1) *Castanea crenata, Sieb. et Zucc. Esquisse d'un répertoire des variétés japonaises*, (2) *Le Kikyō* (*Platycodon grandiflorum D.C.*); J. A. Neame, *Among the meadow and alpine flowers of N. Italy*; J. C. Newsham, *The horticultural notebook*; M. A. Reynaud-Beauverie, *Le milieu et la vie en commun des plantes*; G. P. Slater, *A walk through garden, wood and field*.

The following publishers have sent the books mentioned for review in the Bulletin:—G. Allen and Unwin: T. Niwa, *Chrysanthemums of Japan*; W. J. C. Lawrence, *Practical plant breeding*; Messrs. Edward Arnold: H. Drabble, *Plant ecology*; John Bale, Sons and Curnow: J. H. Holland, *Overseas plant products*; A. W. Knapp, *Cacao fermentation*; Chapman and Hall: G. C. Ainsworth, *The plant diseases of Great Britain*; A. L. Winton and K. B. Winton, *The structure and composition of foods*, vol. 1: *cereals*, etc.; W. Heffer & Sons; E. R. Saunders, *Floral morphology*, I; T. C. & E. C. Jack: S. Clay, *The present-day rock garden*; Macmillan & Co.; J. Borg, *Cacti*; J. H. McFarland & R. Pyle, *How to grow roses*, ed. 18; L. Mansfield, *An artist's herbal*.

The following important works were presented by their authors unless otherwise stated:—L. E. Anderson, *Mitochondria in the life cycles of certain higher plants* (Diss., University of Pennsylvania); E. B. Babcock and G. L. Stebbins, *The genus Youngia* (from Prof. E. B. Babcock); G. Bentham and others, a MS list of Schomburgk's Guiana plants (from Dept. of Botany, University College of N. Wales, Bangor); C. V. Boys, *Weeds, weeds, weeds* (from Wightman & Co. Ltd.); R. Bracher, *Ecology in town and classroom*; H. Bravo,

Las Cactaceas de Mexico (from the Director, Instituto de Biologia, Mexico) ; British Association for the Advancement of Science, *Report of the Annual Meeting* 1936 (from Miss E. M. Wakefield) ; H. Chermezon, *Révision des Cypéracées de Madagascar* (3me Partie) ; Ren-Chang Ching, *Icones filicum Sinicarum*, Fasc. 4 ; E. Chiovenda, *La collezione botanica fatta dall'Ing. Edgard Taschdjian nell' Impero Etiopico nel* 1935–36 ; N. Chowdhury, *Notes on some Indian species of Lycopodium with remarks on the distribution of the genus in India* ; M. Chrysostom, *The influence of several benzene derivatives on the roots of Lupinus albus* (Diss., University of Pennsylvania) ; H. N. Coley, (1) *Our heritage of fruits*, (2) *Our heritage of garden flowers* ; Collecting books of the late Thomas Cooper, 3 vols. (from Miss E. E. Brown) ; J. Burtt Davy and A. C. Hoyle (Eds.), *Check-lists of the forest trees and shrubs of the British Empire, No.* 3 (from the Director, Imperial Forestry Institute, Oxford University) ; A. E. Douglass, *Climatic cycles and tree growth, Vol.* 3 (from the Carnegie Institution of Washington) ; J. K. Edwards, *Cytological studies of toxicity in meristem cells of roots of Zea Mays*, I (Diss., University of Pennsylvania) ; *Fungi exsiccati Suecici, praesertim Upsalienses*, Fasc. I–II (from Miss E. M. Wakefield), Fasc. III–VIII (from J. A. Nannfeldt) ; J. R. Furlong (Ed.), *The preparation of Empire hides and skins* (from Director, Imperial Institute) ; E. H. Graham, *Flora of the Kartabo Region, British Guiana* ; P. J. Greenway, *A Swahili dictionary of plant names* (from Director, East African Agric. Res. Stat., Amani) ; C. H. Grey, *Hardy bulbs* ; J. H. Holland, *Overseas plant products* (3 copies) ; P. Horaninow, *Prodromus monographiae Scitamineanum* (from Dept. of Botany, University College of North Wales, Bangor), G. Houtzagers, *Het geslacht Populus in verband met zijn beteeknis voor de houtteelt* ; E. Hultén, *Outline of the history of arctic and boreal biota during the Quaternary Period* ; H. A. Hyde, *Trees and shrubs* ; M. M. Iljin, *The family Chenopodiaceae* ; U. N. Kanjilal, P. C. Kanjilal, A. Das and C. Purkayastha, *Flora of Assam*, Vol. 1 (Part II) (from the Conservator of Forests, Assam) ; S. R. Kashyap, *Lahore District flora* (revised and completed by A. C. Joshi, with a foreword by H. Chaudhuri) (from Dr. H. Chaudhuri) ; B. A. Keller (Gen. Ed.), V. N. Lubimenko, M. M. Iljin, R. J. Kristson, V. N. Makogon (Editors), *Rubber and rubber-plants* I, 1936 (from Dr. M. M. Iljin) ; J. H. Kempton and W. Popenoe, *Contributions to American archaeology, No.* 23 (from Carnegie Institution of Washington) ; R. Kidston and W. H. Lang, *On Palaeopitys Milleri McNab* (from Dr. W. H. Lang) ; R. Kidston and W. H. Lang, *Notes on fossil plants from the Old Red Sandstone of Scotland*, I (from Dr. W. H. Lang) ; A. J. G. H. Kostermans, *Revision of the Lauraceae II* ; I. M. Lamb, *On the morphology and cytology of Puccinia Prostii, Mong., a micro-form with Pycnidia* ; C. S. Larsen, *The employment of species, types and individuals in forestry* ; J. Lebrun, *Répartition de la forêt equatoriale et des formations végétales limitrophes* ; T. Lippmaa, *Les collections systématiques*

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Periodical publications, additional to those mentioned in recent Reviews, which have been presented by the editors, societies or institutions issuing them, unless otherwise stated, are as follow :— *Acta Universitatis Voronegiensis* (botanical volumes only, tom.

7 & 9) ; *Bulletin of the Colonial Institute of Amsterdam*, vol. i, no. 1 ; *Contributions from the Laboratory of Systematic Botany and Plant Oecology, Taihoku Imperial University*, no. 1 ; *Icones Plantarum Formosanarum*, VI : *Supplement* (from the Department of Forestry, Formosa) ; *Imperial Forestry Institute Papers*, nos. 1–11 (*Oxford University*) ; *Journal of the Scottish Rock Garden Club*, No. 1, 1937 ; *Journal of the Southern Appalachian Botanical Club*, vol. 1 & vol. 2, nos. 1–6 ; *Lavori Istituto Botanico R. Universita di Modena*, nos. 1–7 ; *Naturalia* . . . publ. Sociedade Portuguesa de Ciências Naturais, vol. 1, nos. 1–4 ; *Orchid Digest*, of the Orchid Society of California, vol. 1, nos. 1–3 ; *Studia Botanica Cechoslovaka*, vol. 1, no. 1 ; *Transactions of the Omsk Institute of Agriculture*, vol. 1, no. 1 ; *Travaux de l'Institut Scientifique de Biologie, Tomsk*, vol. 1.

Various publications have continued to come from the Empire Cotton Growing Corporation, the Imperial Agricultural Bureaux and from many Departments of Botany, Agriculture and Forestry at home, in the overseas Empire, and in foreign countries.

Once again we are indebted to authors, too numerous to mention in detail, for reprints of their botanical papers.

Further maps of the fifth (relief) edition have been kindly presented by the Ordnance Survey Office, Southampton, while the War Office has continued to supplement our map collection by sending us copies of their maps as issued.

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